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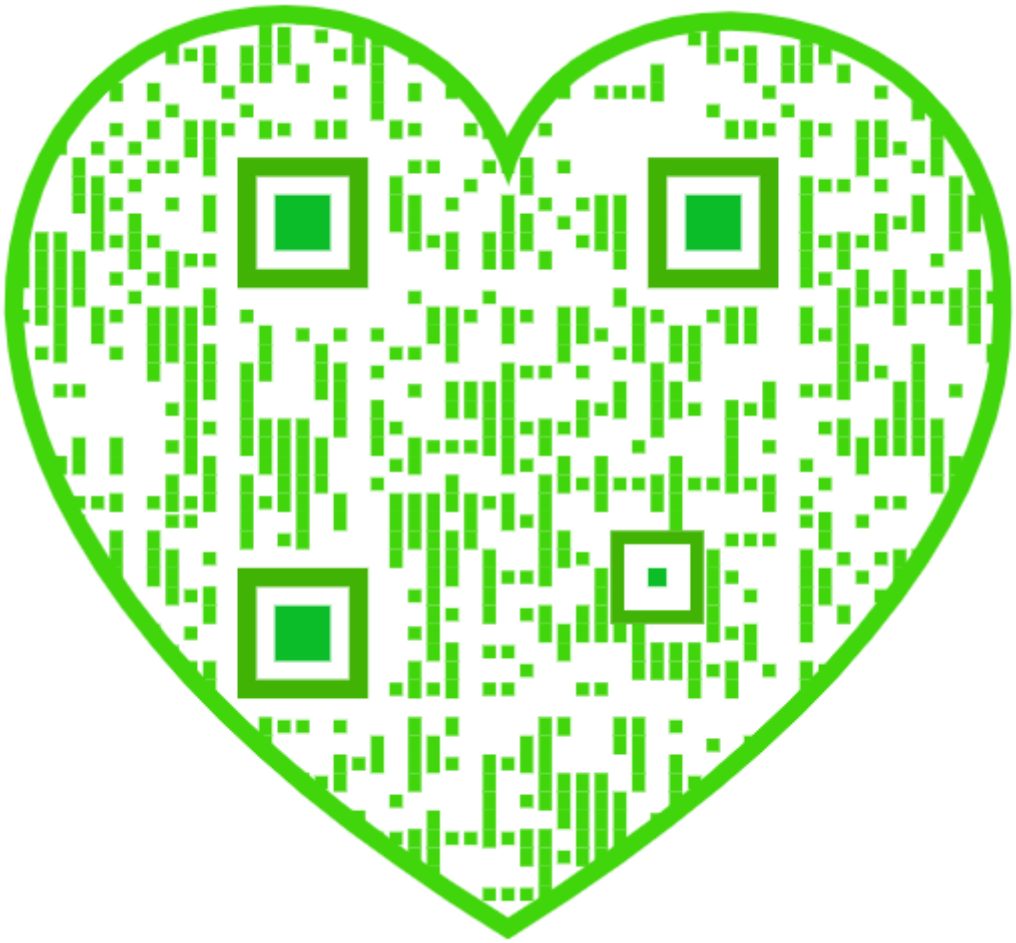

THE TEACHING OF ARCHERY

By

DAVE *and* CIA CRAFT

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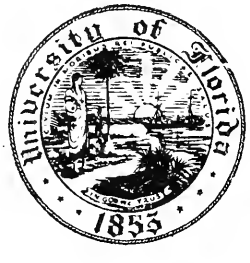

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BY

DAVE *and* CIA CRAFT

NEW YORK

A. S. BARNES AND COMPANY

INCORPORATED

1936

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PREFACE

As archery grows in popularity as a sport for schools, camps, and colleges the demand for trained enthusiastic archery teachers grows. Many persons teaching physical education to-day were trained before archery was included in the sports curricula of their colleges, and so when they find themselves faced with the problem of teaching it, wonder how to begin. The following pages were written to help such persons.

As to the "best" method of shooting, there are, in reality, almost as many good methods of standing, drawing, aiming, etc., as there are individual good archers, for as the individual archer improves in technique and grows in experience, he develops individual traits in his manner of shooting. We could not, naturally, attempt to describe these many good methods here; our aim is to give you the method, from our own and others' experiences, that best gets the beginner started playing archery with comfort and pleasure.

The material in these pages is based on our twelve years' enjoyment of archery as a sport and our eight years' experience in teaching both group and individual archery to juniors and adults on private, commercial, camp, and school ranges.

We want to thank the groups of adults and students who have taken our Archery Teacher Training Courses based on the material in this text. Without their criticisms and their willingness to be the victims of experimentation we would not be able to give you the following suggestions which we think will help you to make archery pleasurable to those in your charge.

DAVE AND CIA CRAFT

April, 1936

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THE TEACHING OF ARCHERY

CHAPTER I

GETTING SCHOOL OR CAMP TACKLE IN ORDER

(A) Bows

YOUR first move on reaching the camp or school where you are to teach archery should be to take stock of the equipment on hand. Make a complete inventory of all archery equipment in duplicate or triplicate, turning a copy in to the office of the camp director or school departmental head, and keeping one or two copies for your own files.

Next examine the bows.

Bracing a Bow: Girls' or women's bows are usually 5½′ long and have their best cast (ability to shoot arrows hard and fast) when strung with from 5½ to 6″ distance between the string and the bow handle when the bow is braced (bow string loop in upper nock [groove] so that the string is taut) ready for shooting.

Though the individual archer finds the proper stringing distance for the best possible cast in his own bow by experimenting, this method obviously is not possible with camp- or school-owned bows since they will be shot by archers of varying heights and with varying length arrows. Therefore you need only be sure that your school or camp bows are strung within this standard 5½ to 6″ limit. When bows are strung so that there is less than 5½″ between string and handle they are said to be "understrung" and may whip the left wrist when shot. Bows that are "overstrung" (strung with more than the 6″ limit) are under too great a strain and may break.

In order to determine, then, whether your bows are strung to the proper height you must brace and measure them. And this is the proper method of bracing a bow:

(Illus. 1.) Hold the bow with its belly side (the rounded, not the flat side) down, close to and across your body and

with its lower nock (the nock to which the bow string is tied) beneath your right instep. With the heel base of the left thumb exert pressure downward against the bow just below the string loop until the string is not taut and its loop can be eased with the TIPS OF THE FIRST TWO FINGERS of the left hand into the nock. During this process the right hand should be pulling upward toward your body, just below the bow handle.

Some archers place the lower nock beneath the left instep and ease the loop into the nock with the tips of the first two right fingers. Both methods are correct since both allow distribution of pressure to both ends of the bow. Use the method which is easier for you. Be sure, however, that neither you nor your students or campers ever brace a bow in any other way. To do so may cause it to break.

Adjusting a Bow String: If, then, upon bracing a bow and measuring the distance between the string and the handle you find that it is either over or understrung, unbrace the bow in much the same way that you braced it, relaxing the string and easing the loop out of the nock and down onto the bow. Next untie the "timberhitch" (the knot with which the string is applied to the bow) by merely pushing the loop of the hitch to the right with the thumb. Next, and efficiency in this matter comes only through practice, judge with your eye just how much nearer the end of the string the timberhitch will have to be tied if the bow was overstrung or how much farther down from the end it will need to be tied if the bow was understrung.

Then place the loop end into the upper nock and put the upper nock under your right instep, preparatory to retying the timberhitch and holding the string tight so that the loop will not slip out of the upper nock. (Fig. 1.) Now, with the belly side of the bow toward you, wrap the string *clockwise* once around the bow, starting at the place on the string where you decided the hitch would need to be made if the bow was to be strung the proper height. Bring the tip end of the string under the string itself when you get it around in front next to you, then run this tip end down between the bow and the right

(1) BRACING A BOW PROPERLY

side of the string loop and pull it downward and to the *right,* thus forming a loop on the belly side of the bow, but this time on the *back* side of the bow, pulling the tip downward and around the bow to the front of the loop.

Now reverse the bow and after slipping the string loop out of the nock at the top and down the bow about six inches, again put the lower nock end up, push the timberhitch into the

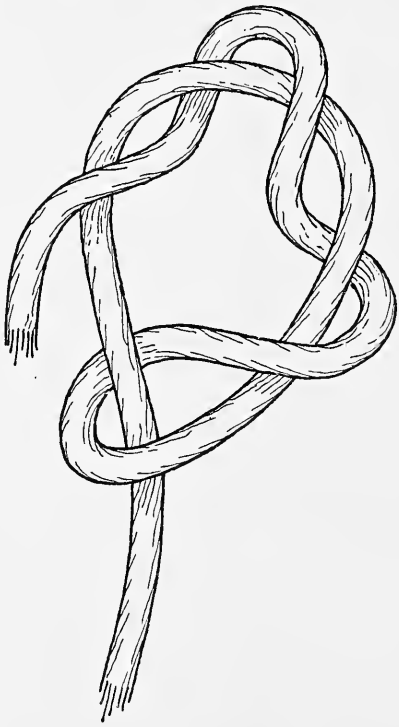


FIG. 1. MAKING THE TIMBERHITCH

lower nock and adjust it so that the loop in the timberhitch is in the *center* of the nock and is tight against the bow.

Next brace the bow in the proper way and sighting down the bow, with the string side up, see that the loop of the timberhitch is in the exact center so that the bow string cuts the bow in half. Change ends and see that the string coming out of the upper nock likewise bisects the bow.

Finally, measure the distance between the bow handle and the bow string. If it is too great, untie the hitch (after unbracing the bow) and make it slightly farther toward the end of the string. Or if the distance is less than 5½″, make the

knot farther toward the center of the string. Brace the bow and measure the distance again. You may find it necessary to make several attempts at the outset, but soon you will learn to make the proper adjustment on the first attempt.

Examine all the bows and make whatever string adjustments are necessary.

Serving a Bow String: Most good bows carry handmade strings of many single strands of pure linen thread. In order to prolong the life of the string a single wrapping of stout thread is placed over the bow string for several inches near the center where the arrow fits onto the string.

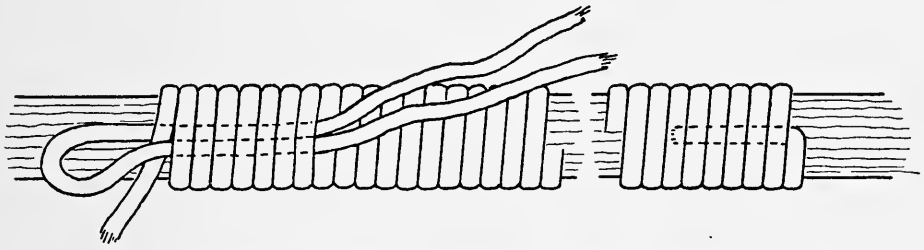


FIG. 2. SERVING A BOW STRING

You can give additional life to your bow strings if you will watch these "servings," as the wrappings are called, and replace them as soon as they begin to fray or wear. And this is the way to do it. (Fig. 2.)

Brace the bow and measure it to be sure that it is strung at the proper height, then take a razor blade or sharp knife and carefully cut the worn serving away—care must be taken here lest you cut strands of the string itself and so weaken the string. Next take a three-yard length of #18 Meyers' shoe thread which you have obtained from a shoe repair shop or archery supply house, and wax it with bowyers' wax—likewise obtainable for a few cents from any archery supply house. Double and wax this string lightly again.

Place this serving string across the bow at the top of the handle and the bow string exactly at right angles, as though the string were the arrow across the bow—you do this to ascertain the spot where the arrow will fit onto the string. Now take the serving string one-third of the way from the

end, between your right thumb and forefinger, and holding the serving string onto the bow string securely at this spot, swing the bow onto your knees and start winding the serving string over the bow string away from you and toward the right of the lower bow nock. This wrapping makes a smooth covering over the bow string.

When you have used up all but about three inches of this string, cut a foot of this same thread. Double and wax it lightly, then double it again to form a loop. Lay this loop on the serving you have just made, with the *loop end* toward the right and the lower bow nock. Continue winding the serving string, covering this extra loop until only a little of the serving string is left. BE SURE TO LEAVE THE CUT ENDS OF THIS LOOP STICKING OUT TOWARD THE LEFT WHEN YOU BEGIN TO SERVE OVER IT.

Now run the end of the serving string up through the loop *slackly* and then jerk the ends of the loop BACK TOWARD THE LEFT. This pulls the end of the serving string back under the serving itself and prevents its coming unwound. With your knife cut off the serving string end which was pulled through.

Now serve the string above the handle with the other end of the serving string in the same way. This should reënforce at least two inches above and about six below the place where the arrow fits onto the string.

Making the Arrow Knot: A small knot applied to the string at the point just below where the arrow should fit expedites the mechanical process of fitting the arrow onto the string when shooting, and assures the archer that the arrow is across the bow at the same angle for each shot.

To make this knot, cut a 36″ length of the Meyers' thread. (Fig. 3.) Wax it lightly, then double it. Using this string, measure again across the top of the bow handle to find exactly where the arrow should fit. Mark the spot with a pen or colored pencil. Now grasp the doubled thread about four inches from one end and hold it onto the serving at the marked spot with the thumb and forefinger. Lay the 4″ length of

thread along the serving toward the lower nock. Loop the remainder of the knot thread over the second finger and with the same winding motion that you used for the serving, make a SMALL COMPACT KNOT. When the knot is of sufficient size to prevent the arrow nock's crossing it, yet is still not large enough to feel clumsy, run the end of this thread *slackly* through the loop made by the string held over the second finger. Firmly pull the string that projects to the right, and

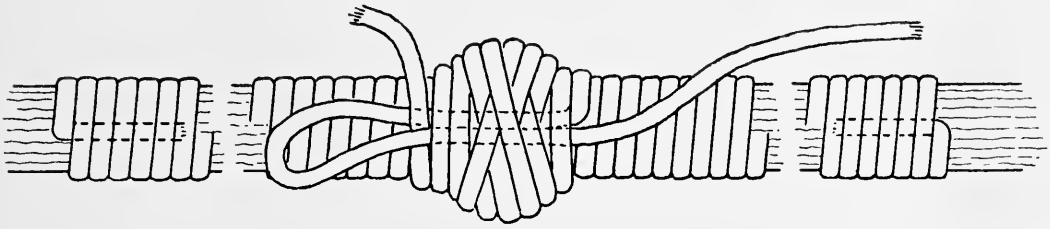


FIG. 3. MAKING THE ARROW KNOT

the end that was used for winding will be pulled back under the knot. Cut off both ends of the thread close to the knot. DON'T TRY TO PULL THE STRING THROUGH, BUT JUST *under* THE KNOT.

Weighing Bows: Most bows have their weight stamped on their backs. By "weight" of a bow is meant, not its actual weight in pounds, but the number of pounds of pressure that an archer must exert in order to pull the bow to its full draw.

Full draw for a 5′ bow means 24″; for a 5½′ bow, 26″; and for a 6′ bow, 28″. Unless you are acquainted with a bow and know that it will stand a greater draw than this scale indicates, do not pull it beyond the distance indicated.

You should know the exact weights of all your bows, and since some manufacturers are not careful to mark bow weights accurately, you will do well to weigh these bows yourself.

Making a "Tiller": A simple device for testing the weights of bows can be made from a six foot 2″ × 4″ and a few nails. (Illus. 2.)

Drive a large nail securely into the 2″ × 4″ near the top and at a downward angle. Drive another nail twelve inches below this first one and another every two inches below that

until twenty-eight inches have been reached and ten nails have been driven into the 2″ × 4″. With a soft lead pencil indicate by each nail its distance from the top nail.

To weigh a bow, brace and lay it, belly side downward, over the top nail at the place where the arrow crosses the bow. Hook a pair of spring scales onto the string at the nocking point. Crouching low, pull the scales gradually downward from one nail to the next until the full draw for that particular bow has been reached (24″ for 5′ bows, 26″ for 5½′, and 28″ for 6′), then take the pound reading on the scale. With a pen or soft lead pencil mark the weight on the back of the bow just above the handle.

In using these bows later on the range, remember that if you give a 5½′ bow marked twenty-two pounds to an archer who has only a 24″ draw, the bow will not actually be a twenty-two pound bow in her hands since she has not long enough arms to draw the bow to ITS full draw—26″, but only to her full draw—24″. At her draw the bow will probably weigh eighteen or twenty pounds.

This tester or "tiller" that we have just described provides an excellent means of seeing the shape of a bow. A good bow will show at full draw a stiff rigid center of six or eight inches, then will dip suddenly on either side of this center, forming a gradual and graceful arc from tip to tip. There should be slightly more bend in the upper than in the lower limb.

Remember when testing these bows to proceed warily, not pulling them to full draw at once, but gradually proceeding from one nail to the next downward, pausing to study the bow between changes until the proper nail is reached. If, however, any decided bend or weakness shows up in any spot before the correct draw has been reached, do not finish tillering the bow, as it is weak and may break at full draw. If the number of bows on hand warrants it, discard this bow. If you find that you must use the bow, reserve it for short-armed archers who will not be likely to pull the bow to its full draw.

This tiller is easily and quickly made. Any carpenter, jani-

(2) A DEVICE FOR TESTING BOW WEIGHTS

tor, or handy man around the school or camp can make and nail it up for you. It should be nailed securely to the wall high enough that you can reach its top comfortably. You should have one of these testers made, not only so that you may know the actual weights of your bows, but that you may have it when you come later on to giving points on selecting personal tackle, and for demonstrating to your classes the meaning of bow weight.

Providing Storage Facilities for the Bows: Now that the bows are ready for use—strings adjusted, worn servings replaced, arrow knots applied, and bow weights marked, see that there are correct and adequate facilities for storing the bows when they are not in use and for getting them to and from the range.

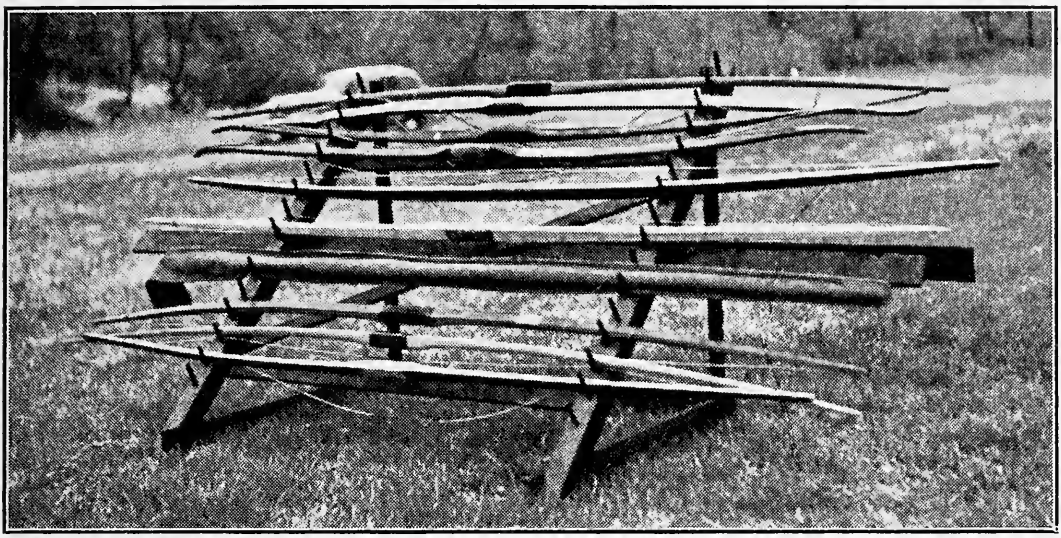
When not in use bows should be stored in a fairly dry, well ventilated, unheated place. They should not be kept hanging in an upright position, but lying horizontally, close to the floor for two reasons. The first is that the wood from which bows are made is sensitive to variations in heat and when they are hung upright the upper end is slightly warmer than is the lower end and may have less life when shot. The second reason is that the bow wood is sensitive to pressure, so the pressure of supporting the bow should be distributed to both ends. In a damp climate they must be kept dry; in a dry climate they must not be allowed to become brittle.

Care must likewise be taken in transporting bows to the shooting range from the storage room or field house. The greatest difficulty lies in the fact that bow strings easily become entangled. Some instructors, to prevent this, advocate a "bow keeper" on each bow—a cord from the upper nock to the string loop which prevents the string's sliding down the bow.

A portable bow rack which serves the double purpose of a storage rack and a means of transporting the bows without allowing strings to become entangled can be simply and inexpensively made by your handy man. (Illus. 3.)

Making a Portable Bow Rack: Here is the way this rack is made: To two bases of 1″ × 4″'s from two feet to four feet

long, nail two 1″ × 4″'s about four feet high. Then nail 2″ × 2″'s from the tops of the uprights to the fronts of the base boards at about 45 degree angles. Nail 4½″ × 1″ × 4″ supports across the uprights—one near the top and one near the bottom. The baseboards may be braced with a 1″ × 4″. Finally bore holes 2½″ apart in the inclined 2″ × 2″'s and set wooden pins in the holes. If wooden pins or dowels are not



(3) A PORTABLE BOW RACK

available use eightpenny nails, but wrap them with black tape to prevent their scratching the bows.

A rack of this sort can easily be carried by two archers and will accommodate as many as 24 bows.

(B) Arrows

Making Minor Arrow Repairs: Next inspect the arrows. All points should be on and tight. If you find arrows with points missing, buy extra points and point cement from any archery supply house. To apply a point, place a few grains of point cement in the bottom of the point. Hold it over a candle flame until the entire point is hot. Then force it onto the shaft with a blow or two.

If it is possible, send your arrows to an archery supply house and have points applied permanently.

Next check each nock—the groove end that fits onto the bow string. Arrows with wedge nocks that have been broken can seldom be repaired. Arrows equipped with replaceable horn or fiber nocks that fit down over a shouldering of the arrow shaft itself, however, can be repaired. You need only to purchase extra nocks and ambroid glue from the maker who supplied the arrows and remove and replace the broken nocks with the new ones. This nock repair requires little time and can be done easily and inexpensively in your own department.

Feathers should be tight to the shafts and should not be too badly frayed and broken. If many are in bad condition, send them back to the factory for "refletching" (refeathering), which can be done at a small cost. If you have the time and energy, or have some one on your staff who is manually inclined, you *can* make feather repairs in your own department. Seldom, however, are the results worth the effort expended.

Repair Kit: You will need a repair kit, as you will certainly find it necessary to make bow string repairs in your own department. Following are items that such a kit should include:

a sharp knife or razor blade
a ball of Meyers' No. 18 shoe thread
a cake of bowyer's wax
half as many bow strings as there are bows on hand.

For making feather repairs:

ambroid or similar glue
steel bead-headed pins
extra feathers cut and shaped.

For replacing nocks:

extra nocks
ambroid or similar glue as for feathers.

For making arrow point replacements, though it is wise to send them to an archery supply house and have new points applied and all points permanently attached:

extra arrow points
arrow point cement
a candle or two
matches.

For cleaning and recresting arrows:

liquid floor wax or clear shellac
fine steel wool
paints, brushes, turpentine, old rags.

It is well at the close of each season to check all arrows carefully, sending those needing repairs back to the factory so that they will be ready for the first of the next season.

Regrouping Arrows into Complete Sets: If you find an assortment of arrows of varying lengths and crests (color designs at the nock ends), try to group the arrows into sets of eight each that are at least of the same length. If you must combine arrows of differing crests to form sets, use steel wool and a knife or scraper to remove old crests from the odd arrows. Repaint these fill-in arrows to match as nearly as possible the crest common to the greatest number in the set. When you buy arrows, ask that crests be simple; they are much easier copied when regrouping becomes necessary.

If the arrows are generally dull and rough toward the point ends after rubbing them well with fine steel wool, clean the dirt off with alcohol, Energine, or any good cleaner, and apply several coats of liquid wax or clear shellac with cloths, not brushes, allowing the arrows to dry perfectly between applications.

See that the arrows are always smooth and well surfaced. Train your archers to examine their arrows between "ends" (six arrows shot), as rough arrows cause most archery injuries, and since particles of dirt on an arrow change its weight and balance point.

Storing Arrows: When not in use arrows should be stored in upright positions to prevent feathers touching each other and becoming frayed.

Satisfactory holders can be made from orange crates or

other soft pine boxes not more than twenty inches in height. Have rows of 3/8″ holes bored one-half inch apart across the top of each box—the number of holes in a row corresponding to the number of arrows in a set to facilitate checking for repair or removing for use. There should be a shelf eight inches below the top of the box with a second set of holes bored to correspond exactly with the top set; otherwise, the feathers will touch and the box be valueless.

It is well to have arrows segregated by length—that is, have a box marked "26″ arrows," another "27″ arrows," and so forth, so that archers returning the arrows after their use may store them more easily. With large classes one box for all arrows is never satisfactory, since it necessitates each archer's waiting her turn at putting her arrows away, thus shortening her actual shooting time in the class period.

(C) Shooting Accessories

Gloves: No matter how many or what quality of bows and arrows your equipment may include, unless there are finger protectors of some sort, your equipment is incomplete.*

Even beginners using sixteen to eighteen pound bows will find shooting a greater pleasure and will shoot longer and more often if their fingers are protected from the sting of the string.

There is a variety of such finger protectors on the market. The most inexpensive (and if your finances must be budgeted, here is the place to do it) is the shooting tab—a piece of Cordovan leather about half the size of the hand, with holes for the first and small fingers. Such a tab sells for about fifty cents. Archers who have become accustomed to a glove do not, as a rule, like to change to a tab; likewise, many persons who have learned to shoot with a tab prefer it to a glove.

Probably the most popular, as well as the most practical, finger protector for class use is the skeleton glove with adjustable wrist fastener. This type of protector sells for from

* See page 70, Accessories.

$1.00 to $1.50 each, depending upon whether the finger tips are of cowhide or of Cordovan. The latter is longer wearing, and allows the string to slip more easily from the finger on the release of the arrow.

Some schools require each archer to supply her own finger protector. This is a good suggestion if it is feasible in your particular case. Just see that each archer in your group has a protector of some sort from some source.

Arm Guards: Don't try to teach archery without having arm guards corresponding in number to the size of your largest group or class. Some instructors contend that if an archer shoots properly, he will not need an arm guard. This statement is disproved by the overwhelming majority of good archers at tournaments who wear guards.*

It is true that if the elbow is slightly bent, as is the modern trend, † the string will be less likely to strike the forearm. A beginner who has the unhappy experience of a bruise from a bow string is likely to flinch or "give" on each shot afterwards, and so spoil her shooting and her fun. If this happens, unless she has more tenacity than most human beings, she will decide that she is not interested in archery after all.

The element of individual physical differences enters into this matter too. One archer's left arm may be shaped in such a way that the string never passes near it as she shoots. The next one may be completely double jointed in the elbow and have, in addition, a well-padded forearm. It is almost impossible for the latter to get her forearm out of the way of the string without grasping the bow with an insecure and tiring grip.

Arm guards are a very necessary part of archery equipment. They sell for around a dollar each. Some archers prefer the laced and others the strap type. The laced type is preferable for group use since it is more readily adjustable.

* See page 70, Accessories.
† See page 71, Hold on the Bow.

(D) Range Equipment

Outdoor Targets: * The hand-twisted target is the most successful type of outdoor on the market to-day. Some are made of long-grain rye straw; others of a coarse swamp grass, known in the locality where it is made as snakegrass. Both are durable. The snakegrass type, however, is much lighter—a quality which must be considered if you find it necessary to remove the targets from the range often. This target, likewise, does not grow brittle and shed so badly as does the rye straw. If you find targets of less than the 48″ size, discard them as soon as possible and replace them with standard size targets so that scores shot on your range can be compared with those shot elsewhere.

Accept the fact that targets will wear out and replace as soon as possible those that have become soft. It is poor economy to use worn-out targets since they cause feather damage to arrows. It is also unfair to your archers, since arrows passing through the target or rebounding from it are discouraging.

Target Tripods: Metal or hardwood standards or tripods should never be used, as they cause arrow breakage.

If the tripods on hand are old and splintered and warped until they are unsteady, they should be replaced with new ones which are easily and inexpensively made. For each tripod the following materials are required:

three pieces of soft pine—
1—2″ × 2″ × 6½′
2—2″ × 2″ × 6′
1—3″ strap hinge
old garden hose.

The two six-foot pieces of pine are for the front legs and the six-and-one-half-foot piece is for the center or back leg. These three legs must be fastened together at the top in such

* Indoor targets, as well as other features of indoor archery, will be discussed in Chapter IV.

(4) RAISING A TRIPOD AFTER HAVING MOUNTED TARGET WHILE TRIPOD WAS RECLINING

a way that the two front legs will have a four-foot spread where they touch the ground.

A simple and effective way to space the legs properly is to lay the three legs flat on the ground with the two short ones on the outside six inches higher than the center one. Next take the left leg and move the bottom of it two feet from the center leg, keeping the two tops together. Do the same thing with the right leg. Now remove the center leg and bolt a 1″ × 4″ cross piece near the top of the two side legs. The two front legs are now properly spaced. Attach the back leg by bolting one end of the 3″ strap hinge to its top and the other end to the top cross piece on the two front legs. Saw off the top cross piece when the back leg has been put on.

The hinge on the back leg makes mounting the target onto the tripod easier since it allows the tripod to be inclined during the process. (Illus. 4.)

As a safety device to both archers and to arrows, nail pieces of old garden hose, split lengthwise, to the portions of tripod leg exposed below the target. This precaution eliminates possible injury to an archer from arrow rebounds from the legs and prevents an unlimited amount of arrow breakage. (Illus. 5.)

Extra Target Faces: Be sure that there are extra target faces on hand, since unexpected accidents such as tearing a target face as the target is being mounted can make a new face necessary. Change the faces when they become worn, since archers become discouraged when they have difficulty counting their scores accurately.

Secure a mattress needle, or sail or sack needle, for sewing the faces to the targets. Use any stout wrapping twine.

Range Quivers: Be sure that your range is equipped with plenty of ground quivers—as many as there are archers in your largest group or class. Have them made of heavy wire or metal, sharpened on one end so that they can be pushed into the ground and with a 3 or 4″ ring at the top. (See Illus. 8, page 24.) They should stand about eighteen inches from the ground. One school uses quart milk bottles with

(5) OUTDOOR RANGE TRIPOD WITH EXPOSED PORTIONS FACED WITH RUBBER HOSE TO PREVENT ARROW BREAKAGE OR RICOCHETS

several inches of sand in the bottom for ground quivers. This milk bottle quiver is as effective, but not so attractive or convenient, as the wire type. It is well to take the quivers in with the other equipment when the range is not in use in order to prevent accidents, as well as to prevent their being smashed or misplaced. Quivers may be painted white to show up against the green grass or the ground.

Points of Aim: Permanent substantial points of aim are desirable; otherwise archers will "just guess at" their points of aim or clutter up the range with pieces of paper, handkerchiefs, and so forth.

Points of aim must be large enough to be visible at the greatest distance to be shot and yet small enough to come within National Archery Association regulations—not over six inches high. A satisfactory point of aim can be made from tin or heavier metal bradded or welded to a sharpened post of metal or wood, two to five inches in height. The best colors to use are the surveyors' red and white.

CHAPTER II

SELECTING TACKLE FOR USE ON OUTDOOR RANGES

(A) Tackle for Camp Use

If the camp is offering archery for the first time this season, yours will be the problem of deciding just what equipment will be necessary and from what source the purchases will be made. Buy all the equipment from a reliable archery equipment manufacturing company—one preferably whose products you know and in whose integrity you have confidence. Do not let an amateur bowyer and fletcher convince you that he can furnish your equipment for less. He cannot supply you with *standard* tackle for less. The following are some suggestions for your guidance:

BOWS

Description: Camp bows should certainly be made of lemonwood, the best medium priced bow wood available. Yew and Osage bows are preferred by some archers for their personal use, but *good* yew and *good* Osage bows are far too expensive for camp use.

Just as buying yew or Osage bows for camp is a needless extravagance, so buying hickory or ash bows is a waste of money. They do not shoot so pleasantly as do lemonwood bows, and since they are coarse grained, easily become brittle, and break. Buy lemonwood bows.

A self-nocked lemonwood bow is better for camp use than one with metal or horn nocks, since applied nocks often come off or break and are difficult to reapply. Metal or horn nocks likewise make bracing the bow difficult, particularly for young short-armed archers.

Insist that the bows you buy have one-piece leather handles,

as handles of furniture gimp, string, or strip leather soon come unwound.

Insist that each bow be equipped with a pure linen string.

Specify that each bow shall have a point of aim on or below the target at fifty yards with arrows of the proper length for the bow.

Return any bow you receive which has checks or knots or is poorly finished.

Do not accept a bow with bad bends; that is, a bow should not bend in the handle as bend-in-the-handle bows jar unpleasantly in the hand when shot. It should not be whip-ended (a bow whose upper and lower limb bends come too near the ends) as whip-ended bows are likely to break in these near-the-nock bends. A good bow when braced and held upright in the hand shows slightly more bend in the upper than in the lower limb. At full draw, or on the tiller, it shows a gradual graceful bend from the dips on either side of the handle to the nocks, not bending or bulging noticeably in any spots.

In deciding the number of bows you will need, be guided by the fact that not more than four should, but as many as six persons can, shoot on one target at one time.

Lengths: The majority of the bows you buy for girls' camp use should be 5′ 6″ long. If you must budget your expenditures for archery equipment, and if the group taking archery includes girls as young as eleven years (it is rarely wise to attempt to teach archery to *groups* of children younger than eleven), provide for the fact that these young children are less strong and are shorter-armed than the fourteen- to eighteen-year-olds by supplying them, not necessarily with lighter 5′ bows, but with *short* arrows to be shot in the same 5′ 6″ bows used by the older archers. For twenty-four- and twenty-six-pound bows will be only from eighteen to twenty pounds with 22″ to 25″ arrows.

If your camp group includes a counselor training division of college-age girls, you may need some 5′ 9″ or 6′ bows, since some of these older girls may require 27″ or 28″ arrows.

Weights: Girls from eleven to fourteen years of age *usually* shoot comfortably bows ranging in weight from fourteen to twenty-two pounds; those from fourteen to eighteen, bows weighing from twenty-two to twenty-six pounds; girls of college age, twenty-two to thirty pounds.

ARROWS

Description: Camp arrows should be made of Port Orford cedar or Norwegian pine, both of which are *light* and *durable*. The shafts should be straight and round.

Each should be "footed" with a hardwood splice at the point end as this hardwood reënforcement helps the arrow to stand the shock of tripod-leg hits and thus prevents breakage. Footed arrows cost more than do self (those without the hardwood reënforcement) at the outset, but are more economical than self arrows in the end.

The arrows should have parallel steel piles—not brass bullet type points which blunt easily—permanently clinched or fastened on in some way.

The feathers should stand at right angles to the shaft and be spaced an equal distance apart and parallel with each other.

They should have replaceable tubular horn or fiber nocks—not wedge type nocks since the latter are not so protective as are the tubular type.

Matching: In ordering, insist that your arrows be matched in spine (ability of the arrow to straighten out after passing the left side of the bow) as well as weight.

Buy arrows in MATCHED GROUPS OF SEVERAL SETS OF A GIVEN LENGTH so that when one set dwindles to five from loss or breakage, these five can be recrested to match the remaining sets of the original group, and in this way the original matched-character of the remaining sets will be retained—the same principle as buying three pairs of stockings of the same shade at one time.

Crests: HAVE ALL ARROWS OF THESE SEVERAL-SET GROUPS OF A GIVEN LENGTH PAINTED ALIKE BETWEEN THE FEATHERS

with distinguishing wide bands of color below the feathers; that is, 26″ arrows, blue; 27″, orange; 28″, red, and so forth. Thus an archer using 26″ arrows can quickly find a set of her proper length by choosing any blue set and will not mistakenly use a 27″ or 28″ arrow in her 5′ 6″ bow and thus incur the risk of breaking the bow. She will be less likely, moreover, mistakenly to select a 24″ set with the possibility of overdrawing and injuring herself or breaking the arrow. This plan simplifies recresting, too, since only the wide color band below the feathers need be changed.

Lengths: Since most of your bows are 5′ 6″ long, most of your arrows should be 26″ long—the maximum length for a 5′ 6″ bow. As was said earlier, it may be well to select some very short arrows for your younger and shorter-armed archers. A girl as young as eleven may require arrows as short as twenty-two inches, since longer arrows would extend beyond the bow when pulled to her full draw. Too long arrows lessen the casting qualities of the bow, thereby necessitating higher points of aim and causing discouragingly frequent low shots.

You will order then chiefly 26″ arrows, with some 24″ and 25″ at least for your younger archers, and some 27″ and 28″ for your taller archers, IF THE CAMP EQUIPMENT INCLUDES 5′ 9″ AND 6′ BOWS.

(B) Selecting School or College Tackle for Outdoor Range Use

The advice given on selecting camp tackle applies as well to the selection of school or college tackle. Overemphasis cannot be placed on the necessity of your purchasing *footed* rather than *self* arrows for school use, since the school archery season is longer than the camp season and requires arrows that will last. Particularly is this true in the South where archery is taking its place as a year 'round sport for women, or in schools with indoor as well as outdoor ranges where archery is taught uninterruptedly for nine months.

And here is a suggestion: If the amount of money available

for archery equipment in your school is meager, consider the feasibility of your department's supplying range equipment (targets, tripods, points of aim, quivers) and bows only and requiring students to supply their own arm guards, gloves, and arrows.

And another suggestion, if your available funds will allow, and one that will raise the quality of the archery on your campus: Issue a set of eight matched arrows to any archer FOR HER USE ONLY when she has shot three consecutive 200 scores on the ladies' Columbia round.*

Suggested Budgets on Minimum, Adequate, and Ideal Bases for Classes of Sixteen with Items Needed and Their Approximate Costs

MINIMUM BUDGET

bows	4 at $5	$20.00
arrows	8 sets, 8 each, at $4	32.00
targets	1 at $12.50	12.50
target stand	1 at $3.50	3.50
miscellaneous	extra faces, finger tabs, arm guards, etc.	10.00
	Total cost	$78.00

With this amount of tackle, archers shoot in shifts. Class is divided into groups of four, each group with one bow and two sets of six arrows (extra arrows are kept aside as spares in case of breakage). In each group, two archers shoot and arrows are retrieved, then the second two shoot. Or each archer may shoot three arrows, and retrieving be done after all four have shot three arrows.

ADEQUATE BUDGET

bows	8 at $5	$40.00
arrows	16 sets of 8, at $4	64.00
targets	2 at $12.50	25.00
target stands	2 at $3.50	7.00
miscellaneous	extra faces, finger tabs, arm guards, etc.	10.00
	Total cost	$146.00

* See standard rounds for women, page 75.

On this basis, archers are grouped in couples to share bows, but each has a set of arrows. First archer shoots with the common bow while second archer observes, then second archer shoots. The entire class retrieves when all have shot. (Eight to a target.)

IDEAL BUDGET

bows	16 at $5	$80.00
arrows	16 sets at $4	64.00
targets	4 at $12.50	50.00
target stands	4 at $3.50	14.00
miscellaneous	extra faces, finger tabs, arm guards, etc.	15.00
	Total cost	$223.00

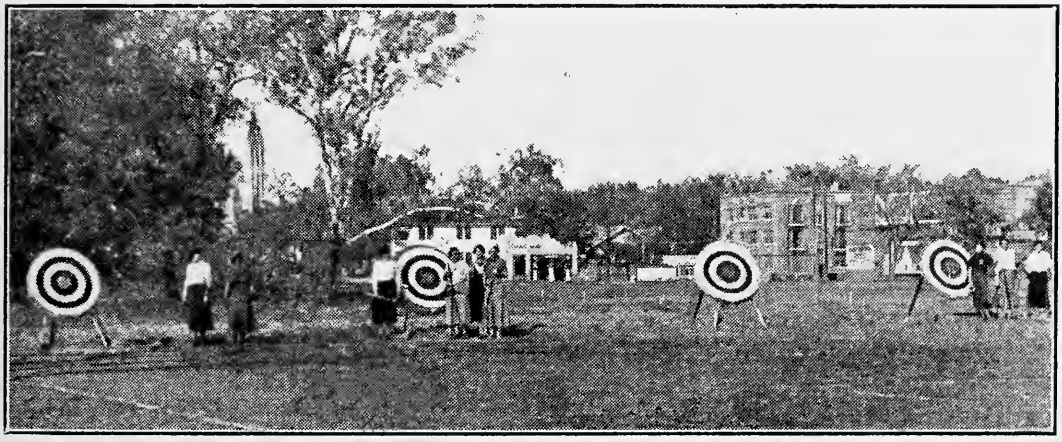
CHAPTER III

LAYING OFF CAMP OR SCHOOL RANGES

(A) Outdoor Range

When the matter of equipment is settled, lay off the range. If you are in a camp, you will teach, doubtless, on an outdoor range. Many schools, particularly eastern and northern ones, have indoor as well as outdoor ranges. Instructions for laying off an indoor range will be given in a later chapter devoted to indoor ranges alone.

The prime factor in planning any archery range is safety. Therefore allow as much space as possible in each target lane.



(6) TARGETS SPACED TEN YARDS APART FOR SAFETY

With one or two assistants, a hammer, heavy cord, some wooden stakes, nails, a tennis court marker, and a steel tape lay off the range according to the specifications in the illustration on this page. Don't fail to continue the lane lines, if possible, as much as forty yards back of the targets, as these lane delineations are very necessary safety precautions. If, of course, there is a hill against which your targets can be placed, these lane continuations will not be necessary.

This forty-yard safety space back of the targets can be reduced to forty feet if you have built a series of at least ten bunkers six to eight inches high and twenty-four inches wide and spaced four feet apart behind the targets (Illus. 7).

(7) A SYSTEM OF BUNKERS

Such bunkers stop all misses and can be kept as attractive as the rest of the range.

(B) Clout Range

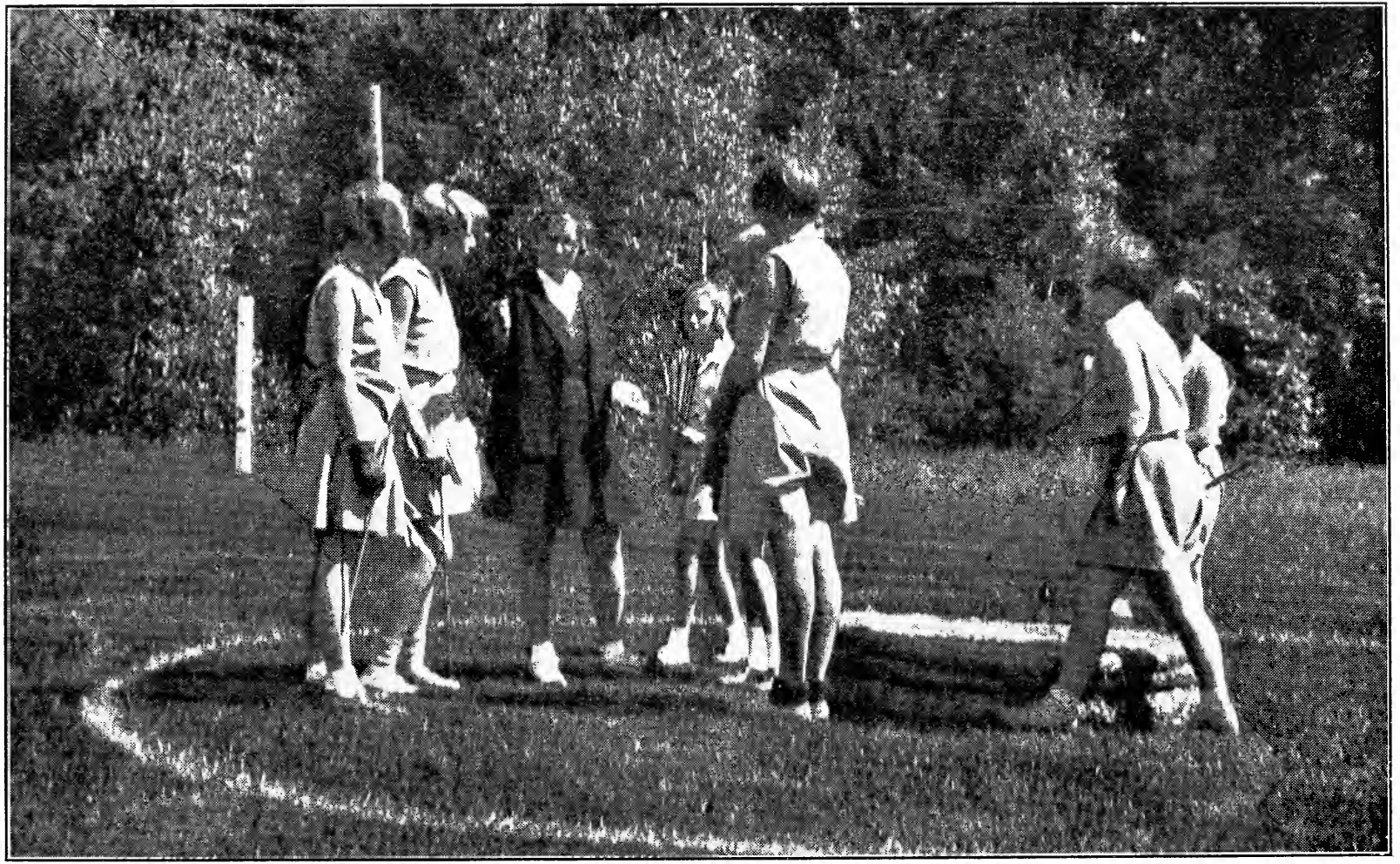
Lay off a clout range by all means if there is room on your camp or school campus. For the regulation girls' and women's clout range a space of 140 yards in length is needed. Camp as well as school and college girls, however, enjoy 80 to 100 yard clout shooting (Illus. 8 and 9). Therefore do not forego a clout range because of lack of regulation space or because of light bows.

If you have no indoor range, clout shooting is the best introduction archers can have to the sport, since to score requires little skill and since it provides a perfect opportunity for teaching the basic mechanics of shooting.

No actual target is required for clout shooting. The only essentials for laying off a clout range are heavy cord for a compass, a steel tape, a tennis court marker, and a colored flag on a one-foot stake.

The clout target is the regulation 48″ target drawn in feet instead of inches on the ground. The complete target will

(8) BEGINNERS ON THE EIGHTY-YARD CLOUT LINE



(9) LEARNING TO SCORE DURING THE FIRST CLOUT LESSON

have a 48′ diameter. Each circle within the outer one will be 4.8′ wide, while the gold will be 8.16′ in diameter. The flag should be placed in the center of the gold to help the archers judge their shots from the shooting line.

If there is sufficient space for two such targets from 80 to 140 yards apart, that is fine. Then archers may shoot one end, six arrows, into one clout, gather their arrows, and shoot them back until the required thirty-six arrows have been shot. One such target necessitates much more walking.

CHAPTER IV

INDOOR RANGES

INDOOR ranges are becoming more and more popular in schools and colleges even in the South where the weather element is not so great an influencing factor as it is in the North and East.

The popularity of the indoor range may be attributed to several of its advantages, among them:

It is the ideal place for starting beginners since the disturbing elements, wind and rain, are eliminated.

It allows more shooting during a class period because less time is required for retrieving arrows, since standard indoor distances are only one-third those of the outdoor range.

Lighter bows may be used, due to the shorter shooting distances.

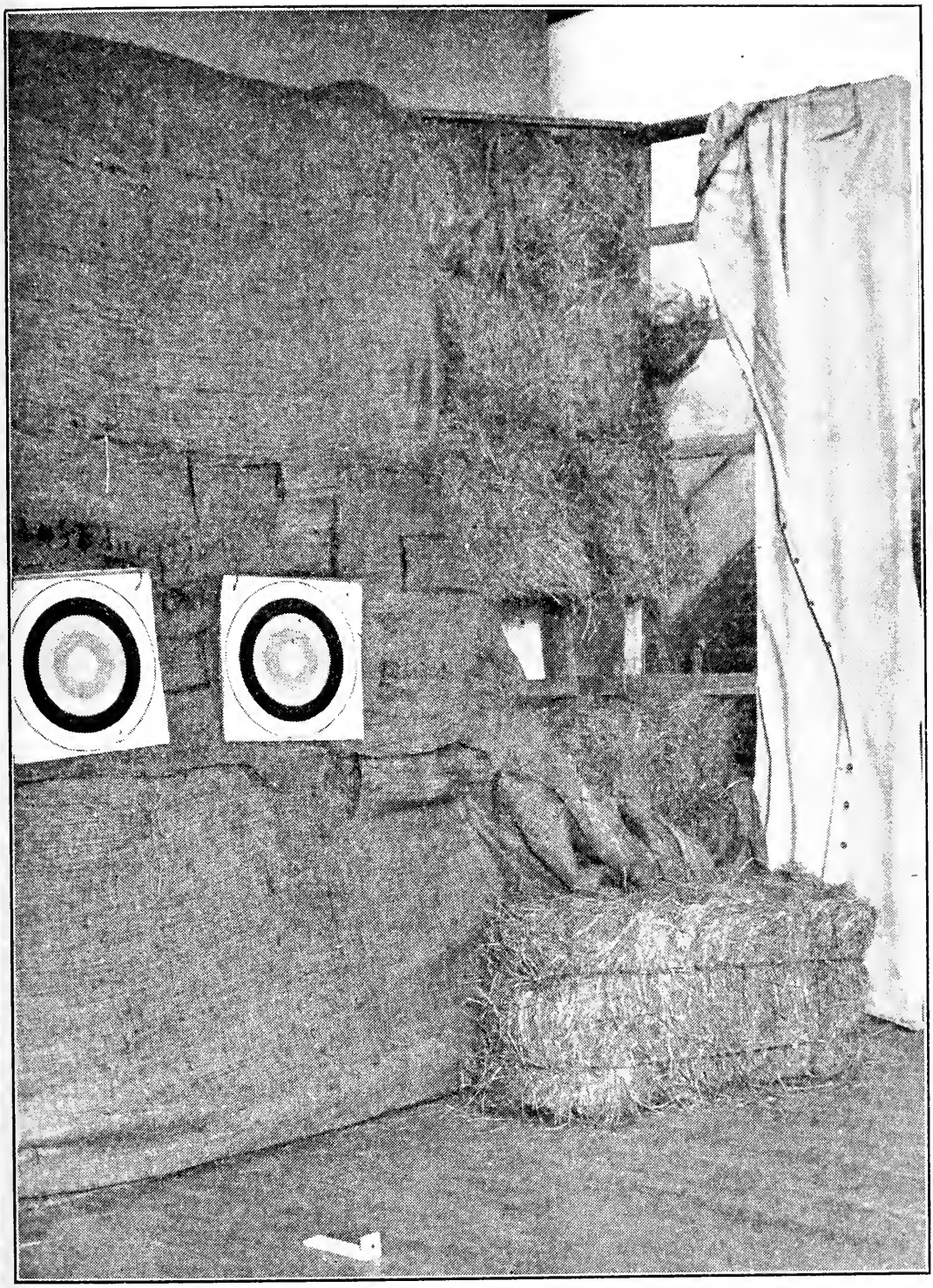
Inferior bows (old, lifeless ones that are unpopular on the outdoor range) may be used since the casting qualities of a bow need not be so great as for outdoor use.

(A) RANGE SET-UP

Permanent Backstops: There are two types of indoor range backstops—the *permanent* and the *movable.*

If there is in your gynasium from thirty to sixty or seventy feet of space where a permanent indoor range can be placed, decide on a permanent backstop, for you will find a range that is always available for practice preferable to one that must be set up for each class or whenever an individual wishes to practice. A permanent backstop made of baled hay and covered with burlap is, morever, durable and inexpensive.

To make such a backstop (Illus. 10) follow these directions, suiting them to your particular space and needs: Use the wall as its back. Build a skeleton frame of 2″ × 4″'s whose height should be approximately 9′ and whose width will be



(10) PERMANENT INDOOR BACKSTOP

determined by the space available and the number of standard 16″ paper target faces it is desirable to accommodate.

If you wish a six target range (to accommodate six persons at a time) the backstop dimensions will be approximately 6 bales by 6 bales, since 6 bales are needed for the 9′ height requirement and since each bale will accommodate one 16″ target.

Choose bales of hay with straight square ends. Place them in the framework on edge and as tightly as possible, using an extra bale whose wires have been removed for filling any spaces which remain in between the bales.

Be sure that the knots in the wires around the bales are placed toward the wall, as these wire knots can cause arrow breakage.

When the hay is solid in the frame, stretch across and nail to the sides a complete covering made of lengths of brown or green burlap sewed together.

The 16″ paper target faces should be glued to 17″ squares of double-faced corrugated paper and then fastened one on each of the bales in the third row from the floor. (See Illus. 10, page 33.) With this spacing no target is placed over a crack between bales, but each is on the center of a bale and is the proper height from the floor. Six inch lengths of heavy wire may be spiraled, and then sharpened at one end, to form a screw for applying targets to backstop. These faces are very inexpensive, so change them often.

Movable Backstops: Some schools have several smaller units such as the one described above. They are on rollers so that they can be moved about as desired.

Other schools use a felt curtain, usually 9′ × 12′ or 15′ and ⅜″ thick, suspended from the ceiling back of regulation outdoor targets. There is not on the market at this time such a curtain that is altogether successful, though there are some suited for use with bows of thirty pounds or less. One nationally known felt manufacturing company is experimenting extensively with curtains for indoor range use and hopes to

develop a curtain that will stop arrows shot from the heaviest bows.

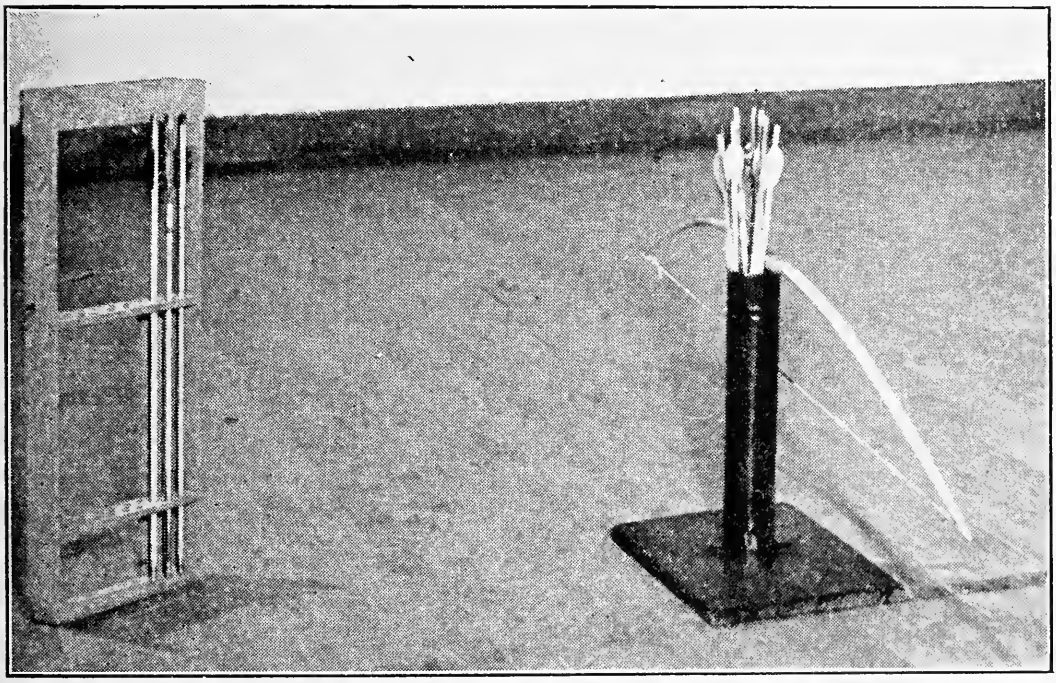
(B) Indoor Range Rounds

While many archers enjoy shooting on indoor ranges as short as twenty feet, it is well, if there is sufficient space, to have a regulation range where the indoor Columbia round (24 arrows each shot at 30, 40, and 50 feet) can be shot. Indoor range scores are usually better than those shot on outdoor ranges, since weather has no effect on indoor shooting.

(C) Indoor Range Equipment

Bows for indoor range use may be lighter than those required for outdoor range shooting.

Arrows should be footed the same as for outdoor range use,



(11) INDOOR RANGE ARROW QUIVER AND ARROW CARRIER

for although there is no danger of breakage from target-leg hits with a solid hay backstop, unless a great deal of time is spent keeping the point ends of the arrows well surfaced with shellac, those ends will wear and become rough from contact

with the hay as this backstop is less compact than a regular hand-twisted target.

With very light bows, archers' gloves can be dispensed with entirely or each archer can shoot with the right glove from any pair she may have. Arm guards will be needed just as for outdoor use.

There should be one point of aim for each target. (See Illus. 10, page 33.) If tin snips are available, cut 1″ circles of tin, making a hole in the center of each large enough to run a spike nail through, and paint them white so that they will show up when stuck into the dark burlap background.

The most suitable holder for arrows on an indoor range is a durable and practicable type used on many commercial ranges. (Illus. 11.) It is made of 3″ stove pipe, 18″ high, flanged at the top, and tacked to a 1″ × 12″ × 12″ base. These make satisfactory storage places as well as quivers.

CHAPTER V

TEACHING ARCHERY

(A) Arousing Initial Interest

Tackle should be put in order and the range laid off, if possible, before the camp season or school semester begins. Then spend a day or two at the beginning arousing interest in the sport.

If archery has not been popular in this particular camp or school or if it is new on this campus, create interest in it before you open the range to individuals or for classes. For though you can always start new classes for beginners, it is best to start them all at first, together.

For a day or two, then, before you allow others to shoot, spend as much time as possible on the range testing out the cast of camp bows and practicing seriously with your own tackle. Many people who shoot have never been taught to shoot correctly and therefore think there is little to the sport. If they see you adjusting your point of aim, "clocking your arrows" (checking them to learn whether they group), and keeping your score, they will feel that you are interested in and enjoy archery as a sport for yourself and that you don't "just teach archery."

Through the camp or school bulletin, or personally, announce your plans for the season. Let your prospective archers know that there will be teams and tournaments, and mail matches with other schools, and that they will have a chance to shoot for national marksmanship medals. Arouse sufficient interest that a great many will come out at first, since the sport is probably an elective. For, as in all human activities, some will drop out, so the more you have in the beginning the better chance you will have of reaching those who will stick with the sport.

(B) Teaching Beginners

Clout Introduction on the Outdoor Range

Now that the range is laid off satisfactorily, your tackle ready, strings served, nocking positions defined, bows strung up the proper distances, and sufficient interest aroused, you may announce that the range is ready for use.

There will, doubtless, be those in your group who have shot before. Many will be able to shoot with acceptable form; others will have shooting habits that need correcting. Therefore, schedule classes for those who already know how to shoot and others for beginners only.

We will deal first with your classes for beginners, speaking from the standpoint of girls' camp archery, since the same methods apply to school and to boys' archery as well.

The number of classes for beginners you have should depend at first altogether on the number who want to learn to shoot. That is, do not limit the number who can participate because of an inadequate amount of tackle and equipment, since most of the shooting at first will be done by one archer at a time, shooting not more than three arrows, and bows may be passed around.

It may be necessary to have several of these beginner groups scheduled each day because of schedule conflicts or too few targets, bows, or arrows, and it may look as though you are undertaking more than your time and the amount of tackle on hand will allow. But remember that in most camps activities are optional. There are no hard and fast class groups, so that all who learn at first will not shoot every day. Then too, since after they have had the first foundation lessons they may use the range at any time for practice, there will not be so many wanting to shoot at one time later.

So don't limit the number who may take up the sport because of inadequate equipment. Just increase the number of classes to meet the demand and after a few days ask your camp director for more tackle. She will probably be glad to get it for you when she sees that it is needed.

Therefore if your announcement of a class for beginners brings more than your equipment will take care of, ask that only those who can be accommodated remain and that the others get into a second group for beginners which will meet that same or the next day.

Then seat your class in a line on the grass away from the targets, cabins or trees where the arrows, which are going to be shot into the air this first lesson, might hit. Take a bow and shoot one arrow at about a forty-five degree angle into the air. (See Illus. 8, page 29.) It will stick upright into the ground some distance in front of the group.

You will find the first reason for starting your class in this way when you hear the gasps of delight as the campers see the arrow speed smoothly into the sky, turn and drop, and then stick into the ground in front of them. It is this thrill that every one gets from seeing an arrow shot into the air that makes clout shooting the ideal way to teach archery. Its only drawback is that in few camps or schools is there sufficient clear space for a clout range.

The second reason for starting your class in this way, and for letting them follow your example by making their first shots into the air instead of into the target, is that most people, particularly girls and women if they have not had specialized physical education training, find it difficult to let go the string if they shoot first at a target or other DEFINITE object. If they are started off with a shot into the air they are not worrying about whether they will miss the target and so will not become tense. It is this body tenseness reflected in the right hand that prevents their opening the fingers to loose the arrow.

After you have shot one arrow, have the first two girls come forward. Hand one a bow—select a bow that you think will be a little too strong for her to pull to full draw, then you will not have to caution her about overdrawing. (You are, of course, well acquainted with the weights of your camp bows and the lengths of the arrows by this time.) Tell her to hold the bow with her left hand at the very top of the handle

so that the handle itself is barely showing and with the bow string touching the inside of her left arm. (The second girl is standing where she can watch this demonstration closely; the others in the class can hear it all.) Now place an arrow on the string for her, drawing her attention to the band or bands of color on it just below the feathers, and telling her that an archer always has a distinctive color pattern or arrangements on his arrows to distinguish them from the arrows of other archers when several are shooting at the same target. Remind her that she must remember the crest, as this color band is called, on the arrow she is about to shoot so that she will be able to identify it when she goes to find it.

Next explain the position that her fingers must take on the string something like this:

"We use only the three middle fingers of the right hand to draw the string and hold the arrow on at the same time. The thumb and small finger, since they have no work to do, can be kept back in the palm of the hand, the thumb over the small finger—salute fashion. Place the arrow on the string just above and down to the knot on the string, the forefinger above the arrow and the second and third fingers beneath the arrow. If you try to pull the string back holding by just the tips of these three fingers the string will slip away from you before you are ready to release it. Besides, if you shoot for a long time using only the tips of these fingers they will become sore even though you have had them protected with a glove or shooting tab. On the other hand if you hold the string in the first joint you will have difficulty in opening your fingers quickly enough when you are ready to release the string. So, hold the string just back of the fat pads on the fingers.

"Now then, extend your left arm, slightly bent, and as you raise it into the air at about a forty-five degree angle, pull the string back toward your chin—pulling in toward your armpit. The arrow will not fall off the bow—your first and second fingers, though they are not pressing the arrow tightly, will hold it on. Now when you have pulled back to the vicinity of

(12) FIRST NOCKING POSITION

your chin, open your fingers quickly and let the string and arrow go."

It is not likely that your archer will have trouble making this first shot. If she does, let her keep trying until she can make it. She can then take her place with the others, and the next girl may come up and watch while the first watcher shoots. She should be able to execute a shot on the strength of having watched your instruction of Archer Number One. Some reminders may be necessary, however.

Go through your entire group, letting each girl shoot one arrow only, then when all have shot, retrieved their arrows and returned to their original places on the grass, let the first two come forward again.

This time see that each girl has a ground quiver by her right side with three arrows (all of the same crest) in it, and that the two are no more than three feet apart, one directly behind the other. This time you are going to teach them to NOCK the arrows (put them onto the string) for themselves.

The easiest way to do this is to take a bow and a quiver of arrows for yourself and stand so that both can watch you without changing their foot positions. Proceed something like this:

"Notice that each of your arrows has three feathers and that one is a different color from the other two. That differently colored one is called the "COCK FEATHER"; the other two are called the "HEN FEATHERS." Now hold your bow UPRIGHT in your left hand with only a slight bit of the handle showing as you did just now, and with your left elbow bent and relaxed close to your body. Reach down with your right hand PALM UPWARD and pick up an arrow ABOVE THE FEATHERS between the first and second fingers, seeing that the cock feather is facing out in front of the tips of these two fingers. (Illus. 12.) You noticed the knot on the bow string just now when you shot. That knot tells you that if you put your arrow on the string immediately above it the arrow will shoot straight ahead when you release it, not at an upward or downward

(13) SECOND NOCKING POSITION

angle. See—if I place my arrow above this knot I will shoot too low; if I place it below the mark I will shoot too high.

"Now bring the arrow up and run it between the bow and the string without changing the position of your fingers. (Illus. 13.) If you picked the arrow up correctly (with the cock feather facing toward the front) the cock feather will now be on the left side and away from the bow so that it will not be torn off as the arrow passes across the bow in flight. All right, remove the arrow and place it again in the quiver while I tell you why this is the only *courteous* and *safe* way to nock an arrow.

"If there are four or five of you shooting at one target at the same time you will of necessity be standing fairly close to each other. If each girl fails to hold her bow upright while nocking, that is, if she tilts or lays it horizontally, she will interfere with her neighbor. Each of you two girls try nocking while holding your bow horizontally or tilting it and see what I mean. (You may get in line with them to add to the efficacy of the demonstration.) So you see that, for courtesy's sake, we nock as I told you. For *safety's* sake we nock as I told you, for as you run the arrow between the string and the bow and across the top of your forefinger, if there is a splintered or split place on the arrow you will discover it and discard the arrow. If you nock the arrow while holding the bow horizontally you can easily fail to see any splintered places and you may shoot a broken arrow and run a splinter into your hand.

"So much for reasons, now let me see you (to First Girl) nock an arrow correctly. Good! Shoot it up into the air as you did just now. All right, now try to aim at the same angle so that the other two will stick near that one. Good! Number Two, you do the same."

Go through the entire group having two up at the same time. Little repetition will be necessary as all will have heard your explanations and instructions.

Allow them to shoot another three arrows each, then use the remainder of the class period for reviewing the points that

you have made in this first lesson. This initial instruction will go rather slowly and there will be little time for shooting.

Remember that your job is putting archery over. There are tennis, riding, swimming and other well established land sports to claim the campers' time. Your job is to make archery so fascinating that campers will come to the archery range each morning at nine instead of going to some other sport.

Don't give too much technical instruction in any one of these first lessons or your prospective archers will become discouraged. You have made a good start in this first lesson. You have captured their interest, shown them that it is not hard to shoot, and taught them to nock an arrow—a purely mechanical act and one less thing for them to learn later when they will be concerned with more intricate matters.

Make your group leave class each day anxious for to-morrow's lesson. At the close of this first lesson announce that to-morrow there will be shooting at the target, or preferably at the clout target if you have a clout range.

FIRST TARGET LESSON (INDOOR OR OUTDOOR RANGE)

Before class place four or five quivers, each containing three arrows from a set, on the twenty-yard line before each target. Across each quiver place a light bow, braced.

"To-day we are going to shoot at the target. I want you to do just as I tell you even though you do not understand why we proceed as we do. To-morrow I will tell you the reasons for the things we do to-day. I have taught archery by several methods and I have found this the easiest and best way to learn to shoot enjoyably."

With something like these words, and standing between your class and the targets, open your first target lesson. Then continue,

"Line up facing me, straddling this *twenty-yard line* (twenty or thirty-foot line indoors) and with a target on your immediate left. Your feet should be far enough apart for balance and flat on the ground, with more weight on the left than on the right foot.

"All right-handed? If any are left-handed, will you please go to the extreme left end of the line, facing the opposite direction from the others so that you will not be confused by their gestures, as you are going to do exactly the opposite of what I say and they do.

"Number one, two, three and four." (Four only on a target if possible.)

"Arms relaxed at your sides. Hands closed without being clenched. Thumbs out as for 'Simon says, thumbs up.'

"As I give the command, 'Left arm sideward upward raise,' with hands still closed, thumbs out and eyes looking at me, raise your left hand to shoulder height, take the next commands and then at the command, 'At ease,' drop your hand to your side again.

"Left arm sideward upward raise! Simon says, 'Thumbs down!' Look at your left elbow or funny bone. It should be toward the back; not on top or beneath your arm, but toward the back. If it is not toward the back, without moving your wrist or left shoulder put it there.

"At ease!"

Repeat.

It may be necessary to run them through this, target at a time, examining elbows carefully as you go until all can get the left elbow back out of the way easily, then continue with,

"This time when I give the 'Thumbs up' command, raise the thumb with wrist motion only, so that your elbow will stay toward the back."

Give the three commands, "Left arm sideward upward raise," "Thumbs down," and "Thumbs up," and examine elbows carefully again, repeating if necessary, then continue,

"This time when I have given the 'Thumbs up' command and when you are certain that your funny bone is back, if your arm is STRETCHED TO ITS FULL LENGTH, or hyper-extended, *relax* it so that there is a slight bend at the elbow with the funny bone still toward the back."

Give the commands to the entire group, and then by targets, examining carefully. Repeat until all understand that the

"Thumbs up" command means elbow back and relaxed. Continue,

"Notice the white dots beneath your target. Find the one to the right center of the target from where you stand, and with your left eye closed and when I give the command, 'Aim,' sight the little white dot over the top of your closed hand—where the arrow will come when you are ready to shoot.

"Left arm sideward upward raise! Thumbs down! Thumbs up! Aim! At ease!

"Every one find the dot?"

If so, continue,

"This time I shall change the commands, giving them to two persons only each time. When I say, 'Position,' see that your feet are properly spaced, left arm is extended, left elbow is back and relaxed, and your left shoulder low. In other words this one command replaces the first three. Then when I say, 'Aim,' close your left eye and find the dot or POINT OF AIM as it is called.

"Position, One and Two! . . . Aim!"

Examine for form.

"At ease!"

If necessary repeat, then continue by twos through the class.

"Now we are going to let the left side rest and learn about the right. Relax your left arm by your side and at the command, 'Draw,' with the three right fingers that you learned yesterday were used in shooting, reach past your left shoulder as though placing them on the bow string and with your right elbow as high as your right shoulder, draw the imaginary string back close along your arm toward your left armpit until it touches the cleft of your chin, and your right forefinger lies well under the edge of your right jaw, ANCHORED THERE, your right thumb touching your throat."

It may be well to repeat this instruction, demonstrating as you do so, then give the command to One and Two and examine and repeat through the class by twos, examining carefully to see that each understands that she must anchor SOLIDLY UNDER her chin. Continue,

"When I give the command, 'Loose,' let your fingers slip or relax back off the string without spreading open, your hand scraping your neck. Your elbow will move slightly back, of course. HOLD THE POSITION into which your right arm has moved, keeping your eyes on the point of aim beneath the target until you count three ALOUD AND SLOWLY. Then drop the pose."

It may be well to repeat this instruction too before you give the command, demonstrating as you do so.

When you are sure that the entire class understands what you want done on the draw and loose commands, put the action of both hands together.

"Now we will use both the left and the right hands, taking the five commands, 'Position,' 'Draw,' 'Aim,' 'Loose,' and 'Pose.' "

Give the commands, check, and repeat as necessary.

"Next take your bow and holding it with the string touching the inside of your left arm, which is in the position we have just learned, close your left eye and as you sight the point of aim over the top of your hand, see the bow string blend in with the left edge of the bow. This is as much a part of aiming as is seeing the point of aim."

Take some time with this, and do not proceed with the lesson until you are sure that all understand what you mean by "lining up the string." Continue with,

"Now we will try the 'position,' 'draw' and 'aim' commands together. When I give the 'At ease' command after the 'Aim' command, let the bow string return to position *slowly,* not letting go with your fingers, as the string loosed without an arrow may bruise the arm and break the bow. Do not grip the bow but hold it lightly. Remember that aim means to locate the point of aim *and* to line up the bow string at the same time.

Give the commands and practice until all can perform well.

"Now you are going to shoot an arrow, at my commands. 'Nock' will mean place the arrow on the string as you have learned to do. 'Position' will mean checking the position of your feet to see that they are not too close together and that

(14) SIGHTING THE POINT OF AIM OVER THE TOP OF THE HAND, PREPARATORY TO THE DRAW

there is more weight on the left than the right, then extending the left arm to such a position that with the left eye closed you can sight your point of aim over your left hand. (Illus. 14.) 'Draw' will mean that with the left eye still closed and the point of aim still in focus, you will draw the string close along your arm toward your left armpit until the string is anchored solidly beneath your chin and is touching the cleft in your chin. (Illus. 15.) 'Aim' will mean checking to see that the *tip of the arrow* now, instead of the top of the hand, is on the point of aim and that the bow string is lined up with the left edge of the bow. 'Loose' will mean letting the three right fingers slip back off the string. 'Pose' will mean holding the pose with BOTH LEFT AND RIGHT ARMS until you count three." (Illus. 16.)

Repeat these instructions slowly, then give the six commands, explaining before you do so that if this first arrow hits the target it will probably be an accident since you have set the points of aim arbitrarily and that each archer learns her correct point of aim for any distance by experimenting. After this one arrow has been shot, do any checking up that is necessary or give any further instruction that may seem advisable, then let them shoot the other two arrows in their quivers in exactly the same way, urging them to use the same point of aim that they used for the first arrow, no matter *where* the first arrow hit in order that from the experiment of these three arrows they may be able to adjust their points of aim so that their next arrows will hit the target—if the first one did not do so. Then as arrows are being retrieved, commend any archers whose three arrows grouped, even though they grouped off the target, and take time to help these archers adjust their points of aim for the next three shots.

Before your class leaves the shooting line (and none should go forward during this lesson until all have shot their three arrows), teach them to lay their bows across the tops of the ground quivers at right angles to the shooting line so that they will not step on them and break them. Have the entire class group about the target that has the most hits and explain that

(15) A COMPLETE DRAW

(16) POSITION AFTER LOOSE

the arrows should be drawn from the target only in this way: Unless written scores are being kept, the person first to draw her arrows is the one who has the most grouped near the center, the next the one who has the next best group, et cetera. To pull an arrow from the target the archer places her left hand flat against the target, with the arrow between the first and second fingers and with the right hand on the shaft where it has penetrated the target, and draws the arrow from the target, keeping it in her right hand along with the others of hers that she pulls from the target. Caution archers against laying arrows on the ground at the target lest others step on them and breakage occur.

When all have retrieved their arrows, adjusted their points of aim, and returned to the shooting line, emphasize the importance of their shooting slowly and rhythmically, and being steady and ready to loose before they do so. Then explain that since some people do things slower and some faster than others, it is better that each archer shoot to her own tempo and that for that reason you will discontinue the shooting commands. Urge them to relax the bow arm, and to let the bow down and not shoot any time they feel unsteady.

Just before time for class to close have your archers turn in their bows and arrows to you. You will have to unbrace the bows to-day but each archer can put her arrows away. Then seat the class on the grass facing you and go over the points you have made to-day, demonstrating as you do so. The points are:

(1) Stand with feet flat on the ground and wide enough apart for balance, with more weight on the left than on the right foot.

(2) Nock the arrow, holding the bow vertically.

(3) Hold the bow lightly.

(4) Close the left eye and locate the point of aim. Extend the left arm, with elbow back and relaxed, and sight the point of aim over the top of the left hand.

(5) With the right elbow the same height as the right shoulder and the left shoulder low and toward the target, draw

the arrow and string close to the left arm toward the armpit until the string touches the cleft of the chin and the top of the right forefinger is anchored securely under the chin, keeping the left eye closed and the point of aim sighted over the top of the left hand.

(6) See that the bow string is lined up with the left edge of the bow.

(7) Check to see that the arrow, now, is on the point of aim.

(8) Check to see that your left elbow is relaxed, with a slight bend.

(9) Loose with one quick backward motion of the string fingers as they relax their hold on the string.

(10) Hold the entire body pose which has resulted from the loose, until the arrow hits. If you have shot correctly the loosing fingers will be in close to and parallel with the neck, and they, as well as the tip of the right elbow, will be several inches farther back than they were when the string was anchored beneath your chin. Your wrist will have rocked forward or backward (on the loose) if it was relaxed, and your hold on the bow was a light one, and when you straighten it up, the point of aim should again be sighted over the top of the hand—in other words, do not *drop* the bow arm after the loose but pose with it as well as with the right arm and fingers. You should still be looking at the point of aim.

Before you dismiss the class tell them that to-morrow you will give the explanations for the things you have taught them to do to-day, and that you will also teach them to brace and unbrace their bows correctly. If you intend to use a progress chart, now is the time to show the chart to the class. Be as encouraging generally as you can, as all this technique seems complicated to the beginner. Some will drop out . . . expect it . . . they do in everything else. You will probably have more than your tackle will care for anyway. If you are patient throughout this lesson and if you give the commands in such a way that the lesson does not drag, you will find most of them back the next day.

SECOND TARGET LESSON (INDOOR OR OUTDOOR RANGE)

Seat your class along the right side of the target lane, facing you, who are on the thirty-yard line. Take a light bow, or your own bow preferably, and twelve or fifteen arrows in a ground quiver. Tell the class that you are going to give the explanations for the things they did the day before.

"At the close of yesterday's class I summarized the things we had learned; to-day I will give you the reasons for them.

"We said that we stood with feet slightly apart—that was for balance. We are likely to become overbalanced if our feet are together. This foot position is natural and comfortable too. We put more weight on the left than on the right foot because beginners have a tendency to pull the body backward from the hips as they pull the string back. So, to overcome that tendency, we put most of our weight on the left foot, then we can't pull backward from the hips."

Demonstrate pulling backward from the hips, showing that it puts the entire body in a strained position and pulls the left shoulder in the way of the bow string. Then demonstrate the correct "stance."

"You explain why I nock with the odd colored feather out and why I hold my bow upright as I nock. . . . I told you during the first lesson.

"We hold the bow lightly because if we grip it, the arm becomes tense and moves to the side at the loose. A grip on the bow results, also, in tenseness in the entire body.

"We close the left eye because it is impossible to line up the string with the left edge of the bow either with both eyes open or with only the left eye open. When we close the right eye, by mistake, our arrows got to the extreme left; when we shoot with both eyes open our arrows have a tendency to go to the right."

Demonstrate.

"We want the left elbow back and relaxed for two reasons: First, because if the elbow is in such a position that the funny bone is toward the bottom instead of toward the back, the in-

side of the elbow will get in the way of the string and get bruised, and the string, deflected, will throw the arrow to the left. We want the elbow relaxed because rigidity there, as in the left wrist, causes a jerk which sends arrows to the left.

"We sight the point of aim over the top of the hand as we draw because when the arrow is at full draw it comes to the top of the hand, and it is the point of the arrow that is ultimately placed on the point of aim. We aim at a definite object beneath the target instead of at the target itself, though if we had a strong enough bow and pulled to our eye instead of to our chin, and the arrow went straight through the bow instead of on the left of it, we would aim right at the thing we wanted to hit."

This is only a crude and not an exact explanation of the reason for point of aim shooting but it is logical to a beginner and satisfies him. Along with this explanation it is well to place an arrow on the string and pull it to full draw, aiming at the gold. Ask the class to tell you where the arrow will hit if it is loosed. They will tell you "high." Loose it and it will go high. Draw another arrow and aim at the point beneath the target, which you established as the proper one before class. They will see that the arrow must be aimed low. Explain that the heavier the bow is the harder and faster it shoots, with the result that the arrow shoots more nearly on a straight line, describing only a slight arc in the air and so allowing a lower point of aim. Tell the class exactly what point of aim you used and then step back to the fifty- or sixty-yard line and shoot another arrow, using the same point of aim. The arrow will fall short of the target. Shoot another arrow from that distance, aiming higher. This demonstration should prove to any skeptics the value of point of aim over "instinct" shooting. Here you might point out that the point of aim method is purely a target method and the instinct shooting is, of course, necessary for hunting. It is usually not difficult to get a class to see the logic of aiming all six arrows of an "end" at the same spot in order to get them all to go to the same place—the difficulty is in getting them to see that the

spot at which arrows must be aimed from different distances must be a different one.

"We hold the right elbow on a line with the right shoulder first in order to protect the drawing fingers."

Demonstrate a high elbow shot, showing that it causes pressure from the string on the inside of the second finger and that a low elbow shot causes too great pressure on the inside of the forefinger. Show too that if one attempts to draw the arrow with the right elbow low, the arrow falls off the hand and away from the bow. It might be well to explain at this time, and to show too, that pinching the arrow nock between the first and second finger on the string at the draw, or drawing the string toward the left breast instead of toward the left armpit causes the arrow to fall off the bow hand.

"We draw the string in close to the left arm, too, because we wish to pull it on a direct line to the front of the chin where it is going to be anchored—to pull it in the direction of the left breast, then left to the front of the chin would be waste motion. It would also cause us to lose the feel of pulling the arrow back in the straight line which the right fingers continue as they let the string go.

"We anchor the string at the completion of the draw because it steadies the drawing hand, and because if we use a definite anchoring point we are more nearly certain that the arrow will fly at the same angle each shot. We draw the string to the front of the chin and anchor our right hand firmly beneath the chin because it is easier to line up the string with the front-of-the-chin anchor. We must draw each arrow all the way to the chin because an incomplete draw causes the shot to fall short, as the bow has less power on the shorter draw."

Shoot one arrow with the drawing hand properly anchored beneath the chin, then shoot another with the hand half an inch or so below the chin. The second arrow will go much higher. It will be apparent to your class that it is necessary to have an anchoring point that is definite. Shoot an arrow with an incomplete draw. It will, of course, go low.

"It is necessary to line the string up with the left edge of

the bow to prevent lateral, or side, misses. Lining up the string is your guarantee that the arrow point, bow, string, and drawing hand are in line."

Shoot one arrow with the string lined up with the right edge of the bow. The shot will go to the left. Shoot one with the string lined up to the left of the bow so that there is space between the bow and the string. The arrow will go to the right.

"We loose by allowing the fingers simply to relax back off the string because any side movement at the loose pulls the string itself to the side and out of the straight path which it must make as it carries the arrow in a straight line to the target.

"Dropping the left arm as the arrow is loosed causes the arrow to drop low. Swinging the left arm back toward the body at the loose, or 'collapsing' as it is called, causes right hits. Looking up from the point of aim at the loose often influences the arrow to go high and left, for the body naturally moves to follow the eyes. Therefore it is important that we 'pose' with our eye on the point of aim and with the left and right hands in the positions they took at the act of loosing. If we hold the bow lightly it will rock forward or backward in the hand at the loose. This is a recent development in shooting technique; not many years ago archers tried to hold the left arm and wrist rigid and to prevent any movement of the bow. Whether the bow rocks backward or forward will depend upon where the most pressure is exerted against the bow by the left hand, and will be a matter of individual differences in hold."

Demonstrate holding the pose and failure to hold it.

"We shoot a bow of the weight that we can pull to full draw without feeling strain and can hold steady until we have our arrow tip on the point of aim and the bow string lined up with the left edge of the bow. The stronger the bow (if it is correctly made), the faster it will send the arrow, so we shoot as strong a bow as we can with comfort and without tiring. If the bow is too strong our arms are likely to quiver and cause inconsistent shooting. We are likely to hunch the left shoulder and to get an incomplete draw.

"The correct length of arrow is the length we can pull back to the cleft of the chin and have only the point extend beyond the bow. Every inch or part of an inch that the arrow extends beyond the bow deadens the swift shooting quality of the bow. If, on the other hand, we shoot an arrow that is too short we will overdraw it; that is, draw it within the bow, and we may break the bow, the arrow, or the string and injure ourselves."

Shoot two or three ends correctly, drawing the attention of the class to correct draw, loose, et cetera. Shift points of aim for demonstration purposes. A common method of designating hits on the target is to speak of the target as of a clock, thus: Hits in the upper right would be one or two o'clock, while hits in the low center would be five or six o'clock, et cetera. Explain that an "end" is the correct name for six arrows shot at the target from one distance and that several such ends, depending on the age and sex of the archer, makes a "flight." You will probably shoot one end each at 50, 40, and 30 yards to illustrate shifting the point of aim.

Give each archer a bow of about the length and weight you think she can brace *easily* and teach the class two at a time how to brace and unbrace a bow. We have found this the best system: (See Illus. 1, page 3.)

"Hold the bow with your left hand on or just above the grip, with the back (flat side) up toward you and the round side (belly) down toward the ground. See that the top (end where the *loop* of the string is) is up. Put the lower nock of the bow under the arch of your left foot, holding the bow close to your right side and across your body. With the heel of your right hand just under the loop and PRESSING HARD on the back of the bow until the string is relaxed and with your second, third, and fourth fingers extended, push the loop into the upper bow nock, pulling up all the time against the belly of the bow with your left hand. Many people find placing the lower bow nock beneath the right foot and pushing the loop with the left hand more natural—either is correct." (See Illus. 1, page 3.)

"When correctly strung there should be from 5½ to 6″ of

space between the bow and the string, depending on the weight of the bow.

"The bow should always be unbraced when not in use. To loosen the string after you finish shooting, take the bow in the same position as for bracing it, and while pulling up as before with the left hand, PUSH HARD with the heel of the right hand near the upper nock until the string is relaxed (not taut as it was when you were shooting). With the third finger of the right hand reach *under* the string (*not* between the bow and the string) and pull the string toward your right hand and outward. Then a mere pluck on the loop with the forefinger that is on top of the bow will bring the string out of the nock and down onto the bow—not over the upper nock of the bow."

Now spend a little time, after each has learned to brace and unbrace a LIGHT BOW, selecting the proper bow and the correct length arrow for each archer. Then let the class practice, shooting three arrows only each time from the TWENTY-YARD LINE. It is well to start this second practice off with practice in relaxing and not shooting each arrow one time before they do let it go. They must learn from the beginning to control their shots and this is one of the best ways to get them doing it. Remind them to shoot slowly and rhythmically. Watch them carefully for incomplete draws, "creeping" (getting a full draw, then loosening up and letting the right hand creep forward before they are ready to loose), not holding the pose, et cetera. Try to catch faulty technique at this stage, before it becomes habit. Practice makes perfect, but it makes bad habits perfect too.

THIRD TARGET LESSON

This lesson is a review of the technical points that have been stressed in the other lessons. After this lesson campers may practice as they find time, trying always to master a satisfactory shooting technique. It is well, however, to announce definite periods every few days when you are sure to be on the range, so that those who need help may know when they can find you there.

At the beginning of the period to-day, before they take tackle to shoot, review the class on the points that have been made before asking the following questions:

Aside from having the wrong point of aim,

WHAT MIGHT CAUSE ARROWS TO GROUP ON THE LEFT?

Answers should be:

String not lined up with left edge of bow.
Right eye closed instead of left.
Bow gripped instead of held lightly.
Left elbow not relaxed, but in the way of the string.
Not holding the pose, looking up too soon.

WHAT MIGHT CAUSE ARROWS TO GROUP ON THE RIGHT?

Both eyes open.
Jerking hand to the side at the loose.
Left arm "collapsing" at the loose.

WHAT MIGHT CAUSE ARROWS TO GO LOW?

Hand too low on bow.
Not holding the pose, dropping left or right hand.
Not completing the draw.
"Creeping," or easing up on the draw after completing it.

WHAT MIGHT CAUSE ARROWS TO GO HIGH?

Hand too high on bow.
Looking up from point of aim at the loose.
Overdrawing, pulling past front of chin.
Arrow knot too low on string, possibly causing feather to cut the top of the right hand.

After the discussion of the above points, say that you wish to add to the causes of poor hits just mentioned. The additions should be:

WHAT MIGHT CAUSE ARROWS TO WABBLE IN FLIGHT?

Not loosing with the proper, relaxing back-off-the-string movement.

WHAT MIGHT CAUSE ARROWS TO SCATTER INSTEAD OF GROUPING?

Not anchoring.
Inconsistent draw, aim, loose, et cetera.

After this review, help the class find the bows and arrows they should have, taking as much of the class period as is needed. Impress carefully on their minds the importance of having the *right* tackle and of using the same tackle each day —if they can.

To-day your class can be taught to count score. Arrows touching the gold count 9; those the red, 7; the blue, 5; the black, 3; and the white, 1. When an arrow touches two colors it is given the larger count. To be considered a hit in the white for a count of one, an arrow must touch, not the black line which separates the "petticoat," as the part of the target face beyond the outer black line is called, but the white itself. An arrow rebounding from or passing through the target at any place on the face is counted five, as though it hit the blue. Arrows hitting the target and glancing off behind the target are not rebounds. A rebound will lie in FRONT OF THE TARGET.

(C) Teaching Advanced Archery

In most camps there are no definitely scheduled classes to which campers go regularly day after day. Just as you scheduled a series of classes for teaching the first basic lessons to beginners, however, announce a definite hour at the first of camp when those who have shot before and who feel that they can use camp tackle correctly without the foundation lessons can come to the range for a check-up on care of tackle, basic technique, et cetera, with you.

Help not more than four at a time to select tackle and then let them shoot three or four ends from the thirty-yard line without interruption, noting poor draws, looses, or whatever faults appear. Some may nock the arrow differently, stand with a different foot position, or draw differently. In making suggestions to these archers remember that there are almost as many good methods of shooting as there are good individual archers and base your initial suggestions for changes in their habits on *safety* and *courtesy*.

After you become better acquainted with them as individ-

uals, you will know which ones you can insist must learn to shoot "with that little spot under the target as an aim," for example, and which are too stubborn to make any changes. Those who are using extremely poor methods will soon see that they are making little progress and will begin to follow the suggestions you are making to the others. Always feel safe in interfering with individual practices if they are UNSAFE, DISCOURTEOUS, or HARM CAMP TACKLE.

Check the ability of these archers to brace and unbrace the bows, retrieve arrows correctly, store tackle properly, etc., and invite those whom you feel should have the freedom of the range and tackle to shoot any time they like. Ask those who learned some of the basic essentials of tackle care during this trial lesson to come for a second check before granting them the use of the range.

What and how you teach these archers who have had previous experience and who consider themselves past the beginner stage as the camp season progresses is the problem at hand. Although the following remarks will be directed to school and college teachers who teach definite classes in advanced archery, much of the discussion will be applicable to camp archery as well.

Before proceeding with a discussion of advanced archery one must decide just where "BEGINNER ARCHERY" ends and "ADVANCED ARCHERY" begins. Many teachers have said, "I can teach archery to the 350 point stage in the Columbia Round, but there's where I stop—I can't seem to get any into the 400 and 500 Columbia class."

Undoubtedly anything over 400 in a Columbia Round WOULD rate any college archer as well advanced. In fact, in a recent survey of methods used by advanced archers,* 425 or better as a Columbia average was used as the basis for deciding who in the country were the best women archers. In colleges, however, probably 350 or better would be the criterion. And certainly there need be no criterion other than

* See page 70, Archery Questionnaire.

score, since any technique employed to make the 350 or better college scores MUST be fairly good.

The problem at hand is WHAT and HOW to teach the 350 point archers in order to get them to the *450 to 500 point class* with the best ranking women archers of the country. The development of skill to a high level is worthwhile in that satisfaction in the activity is much increased by superior performance, and tends to lead the individual to continue regular participation in the sport. The carry-over use of any activity is closely related to skill.

In attacking this problem, then, three things must be kept in mind: FIRST, *the range must be made available for out-of-class supervised practice by archers interested in extra practice.* Archers must have opportunity for out-of-class use of the range. Some supervision is necessary, equipment must be properly checked out and in by a responsible person, and the instructor should be available frequently enough to observe the technique employed and to prevent these archers from developing bad habits of performance. Such practice is worse than none at all.

SECOND, *modern tackle is essential.* High scores are impossible if the tackle is antiquated.

Bows must have sufficient *cast* to permit points of aim on or below the target at all distances shot, and modern bows are made with this requirement in mind. Small, light, matched arrows will do as much to better scores as will heavier and better cast bows. Several archery dealers sell 9/32″ light matched arrows which are as durable as the usual 5/16″ stock and which are also moderately priced. Many of the colleges which do outstandingly good work in archery provide exceptionally good tackle for their advanced groups. Other colleges have a plan whereby a set of matched arrows is assigned to each advanced archer who shoots three consecutive Columbias better than 300.

This custom is a good one, not only because it provides an impetus for improvement, but also because it assures the archer that she may always have the SAME arrows for practice. The

better archers should be urged to own their tackle. In any case, when a student has become fairly consistent in form and scores, she should have arrows which will aid her in materially improving her records.

THIRD, *when an archer has passed the beginner stage, she should be helped in making certain changes in her technique, so that she may achieve superior scores.* Class work for beginners teaches essentials of form generally accepted as good. But it is not the final level of technique. Individual adjustments must be made as soon as the basic skills have been established. Various details can be improved or modified.

For example, it is the writer's opinion (and one borne out in the survey mentioned earlier in this article) that steadier, more consistent shooting is done when the right foot is placed definitely back of the left, thus allowing greater use of the right deltoid muscle at the beginning, and of the back or trapezius muscles in the completion of the draw. This stance cannot, however, be taught successfully to beginners, since it often results in their hunching the left shoulder, pulling backward from the hips, or in locking the left elbow, etc.

Also, it is not wise to lay too much stress on the relaxed and slightly bent left elbow with beginners, since it results in their exaggerating too *greatly* the bend at the elbow, thus shortening their draws noticeably and therefore resulting in discouragingly consistent hits below the target. Nor is it wise to emphasize the "backward loose" with beginners, since their tendency to exaggerate too often results in a wide pluck of the string and therefore wide misses.

Thus, when the nucleus of an advanced group has been developed from the beginners, these individuals should be made to appreciate the fact that to meet the needs of a general group, the basic elements must be presented to beginning classes in such a manner that a middle course is steered, and emphasis placed upon main essentials. They can easily be made to see that having developed a certain amount of control and skill, they are now in a position to refine their technique and to graduate from beginner practices.

Some demonstration shooting may very well be done at this point to show them some of the changes they may wish to make in their performance. These changes cannot, of course, all be made simultaneously. The group should understand what these refinements in form are, and what their effect is in improving performance. They should then proceed to study various elements. Suggested techniques which may be practiced by this group can be listed somewhat as follows:

1. Left foot definitely in advance of right (see Illus. 16, page 52);
2. Increased use of right shoulder muscle in drawing;
3. Emphasis on relaxation of all muscles save those used in holding tackle, with particular emphasis on the left elbow, which should be slightly bent, and left wrist (see Illus. 15, page 51);
4. Bow held more lightly, but with at least three fingers curled around it so that the feeling of security is not lost —this hold should give a feeling of being braced against the bow handle (see Illus. 15, page 51);
5. Extreme or distal joints of the drawing fingers hooked over the string, with first and secondary joints definitely relaxed (not tense and cupped) on the draw; and
6. String loosed by allowing the drawing fingers to "relax back off the string," with the result that the loosing fingers move definitely back along the neck, rubbing it as they move, *shoulder blades coming together in the back.*

ARCHERY FORM OF LEADING ARCHERS

A questionnaire on archery technique was sent to one hundred outstanding archers, both men and women, of the United States and Canada. Of this number, eighty were kind enough to fill in and return the blanks. The archers were selected from the first twenty places (both men and women) of the National Archery Tournament, from lists of state and regional champions, and from numbers of teams which ranked high in the

Inter-Club Team Shoot. All of these selections were based on results in the 1935 tournaments.

The *purpose* of this questionnaire was to ascertain the points of technique common to the majority of the country's best archers—not for the purpose of attempting to standardize shooting technique, but to help determine the best technique to be employed by high school and college teachers in teaching advanced archery. The *findings* of this questionnaire present some interesting facts regarding the technique of shooting. Those which are of particular interest to teachers are given herewith. The actual results of the questionnaire are appended at the end of the chapter and may be referred to if corroboration of these statements is desired.

GENERAL CONCLUSIONS FROM THE STUDY

These comments which follow may be helpful in pointing out those elements of technique upon which the majority of the group of selected leading archers were in fairly close agreement.

1. Teachers who try to economize by dispensing with armguards will note that 90 per cent of the eighty archers questioned use armguards. Of the eight who do not, six are men, whose left arms more often than women's are built so that the string is less likely to strike the forearm during the shot. Particularly with women beginners, flinching is a result of slaps from the string caused by lack of armguard even when a decided bend of the left elbow is taught. Armguards are definitely favored by these experienced tournament archers.
2. Practically none of the eighty shoot without protection for the three drawing fingers. It is true that seasoned archers, as a rule, shoot heavier bows than do student archers, but with even a twenty-pound bow protection of some sort is wise.
3. The fact that 39 per cent use bow sights will doubtless be surprising to many. It is well to acquaint student

archers with the mechanics of bow sights, even though in many cases they may not be able to afford them. Teachers who still cling to the old Robin Hood legend that "instinct shooting" is the only fair method will observe that none of our eighty good archers use that method.

4. Only 30 per cent use UPRIGHT NOCKING—probably because they were not taught that UPRIGHT NOCKING is QUICKER (and this is a particularly important item in group teaching) because the entire act is done with one motion. It is SAFER because split arrows are more readily detected during nocking, and is more COURTEOUS to target-mates because it prevents the archer's bow getting in the way of the persons immediately in front of and behind him. Vertical nocking requires, of course, some indication on the bow string where the arrow is to be placed, but that is simple (see page 6).
5. Note the modern trend toward a loose hold on the bow. Many of us are using the term BOW HANDLE instead of BOW GRIP since the connotation of the latter term makes teaching a loose hold difficult.
6. That some points in modern shooting technique are fairly common to the better archers of the country is clearly indicated in the results of this questionnaire. There are, however, still many types of holds on the bow. Items 2 and 3 under HOLD ON THE BOW were included in this survey in an attempt to correlate bow hold and pressure, and resulting bow, wrist, and elbow action following the loosing of the arrow. Space, however, did not permit a sufficiently detailed study of the matter to warrant any very definite conclusions. It is this phase of shooting which has to do with the "follow through" theory used successfully in many other sports but not yet standardized and generally in use in archery. It is the writers' belief that a set of actions in the bow arm and hand, as standard as the

actions of the loosing hand, will soon be established and that these will correspond to the follow-through theory mentioned and will result in a surprising rise in scores generally.

7. Relaxation of both wrist and elbow, and a slight bend of the left elbow (see Illus. 15, page 51) are fairly new departures in shooting technique and ones, surely, to which we can attribute, in a measure, modern increased scores.
8. A surprisingly large number of teachers still teach the old "up-on-the-side-of-the-face-anchor." It is hoped that they will note the fact that a negligible number of these eighty good archers use that method. Over 50 per cent anchor beneath and in front of the chin (see Illus. 15, page 51). Almost without exception the 8 per cent who anchor "beside the chin" use West Coast form.
9. To the writers' knowledge, "lining up the bow string" has not been generally taught, yet 45 per cent of our eighty archers are conscious of doing it. It may be that the practice is a result of their own experimentation and experience in shooting.
10. Note that 73 per cent of the eighty are conscious of the fact that their loosing fingers move back off the string (see Illus. 16, page 52). That is another modern development and one that definitely helps cut down lateral misses.
11. Although 88 per cent stand "with equal weight on both feet," the authors predict that soon it will be found that more and more of our better archers are placing more weight on the right heel. Already 67 per cent are standing with the right foot back (see Illus. 15, page 51). As the right shoulder muscles are more definitely thrown into the draw, with resultant increased shoulder spread, this shift of weight will come naturally.

In conclusion, teachers should note particularly that these "better archers" are looking to the archery teacher for increasingly "better instruction" and the raising of scoring standards. While the busy teacher has relatively little time in which to conduct the experimentation necessary to the development of new shooting technique theories, a study of form used by these outstandingly good archers should be instructive and should set a good example of a technique to be used in instructing beginners.

The emphasis placed upon the value of improved tackle is also significant. Results in terms of good scores depend largely upon good and consistent technique, but the quality of tackle is also involved. Only carefully matched arrows fly consistently, and the archer who has developed good control of his shooting style should not be given arrows which will counteract the skill he has developed. Many schools cannot afford to provide matched arrows for all archers, but they should have available a number of sets sufficient to provide for the needs of the advanced group. It is an incentive toward perfecting technique when the archer knows the arrow will fly as sent. It is an incentive toward practice in perfecting one's technique if the archer knows he will be assigned better arrows when his control justifies them.

Archery Questionnaire

ACCESSORIES

1.	I wear an armguard	90%
	I do not wear an armguard	10%
2.	On my drawing hand I wear:	
	a. A finger tab	43%
	b. A glove	48%
	c. Either a tab or glove	3%
	d. Finger stalls	6%
	e. No protection	less than 1%

METHOD OF AIMING

1.	As an aiming device I use:	
	a. Point of aim	61%
	b. Sight	32%

c. Both point and sight 7%
d. Instinct none

2. I nock my arrow holding my bow:
   a. Upright 30%
   b. Horizontally 66%
   c. Obliquely 4%

HOLD ON THE BOW

1. I hold my bow:
   a. Tightly 14%
   b. Loosely 77%
   c. Moderately loosely 7%
   d. Method unknown 2%
2. The base of my left thumb rests:
   a. Against the center of belly of bow 55%
   b. To the left of the center 17%
   c. To the right of the center 28%
3. Pressure is applied:
   a. At the base of the thumb 60%
   b. The full length of thumb less than 1%
   c. At the heel of the hand 30%
   d. a and b
   e. Between thumb and forefinger 10%
   f. Method unknown
4. My left elbow is:
   a. Straight 20%
   b. Slightly bent 80%
   c. Appreciably bent none
5. My left elbow is:
   a. Relaxed 60%
   b. Rigid 31%
   c. Method unknown 9%
6. My left wrist is:
   a. Relaxed 60%
   b. Rigid 28%
   c. Method unknown 12%
7. My left wrist:
   a. Moves forward at the loose 49%
   b. Falls backwards less than 1%
   c. Remains practically motionless 45%
   d. Method unknown 6%

ANCHOR

1. I anchor:
   a. Up on the side of my face — less than 1%
   b. Beneath the chin — 80%
   c. Beside my chin — 18%
   d. Method unknown — 2%
2. I anchor:
   a. Exactly in front of my chin — 60%
   b. Slightly to the right center — 9%
   c. Definitely to the right center — 17%
   d. To the left center — 3%
   e. Method unknown — 11%
3. I anchor:
   a. By pressing string hard into chin — 34%
   b. By touching my forefinger to chin — 35%
   c. By touching thumb to neck — 7%
   d. By a, b, and c — 12%
   e. By a and b — 2%
   f. By b and c — 2%
   g. By touching string to nose — 4%
   h. By pressing forefinger hard into jaw — 1%
   i. By touching ear with thumb — less than 1%
   j. Method unknown — 3%
4. When anchored:
   a. I am not conscious of whether or not my bow string "lines up" — 55%
   b. String lines up with left edge of bow — 24%
   c. To the left of the bow — 13%
   d. To the right of the bow — 8%
   e. Method unknown — less than 1%

LOOSE

1. I loose to a regular tempo — 20%
   I loose when I am ready — 70%
   No knowledge of my timing or rhythm — 10%
2. At the loose my fingers:
   a. Remain as nearly in position as possible — 25%
   b. Move slightly back off the string — 40%
   c. Move definitely back off the string — 33%
   d. Method unknown — 2%

BREATHING

1. I am conscious of a breathing rhythm in shooting 40%
2. I am not conscious of any breathing rhythm in shooting 60%

STANCE

1. As I shoot:
   a. There is an equal amount of weight on both feet 88%
   b. There is slightly more weight on my left foot 4%
   c. There is definitely more weight on my right foot 8%
2. As I shoot:
   a. My toes are on an even line 31%
   b. My left toe is slightly ahead of my right 44%
   c. My left toe is definitely ahead of right 23%
   d. My right toe is ahead of my left 2%

GENERAL

1. To what changes or improvements do you attribute the general rise of scores during the past ten years? Better tackle? Better instruction?

   An overwhelming majority answered "Better tackle, especially arrows."
2. Which of the following, in your opinion, should be the most instrumental in increasing still further archery scores in general:
   a. Improvement in tackle?
   b. Improvement in technique?
   c. Standardization of technique?
   d. Better instruction?

   As with No. 1 under GENERAL almost all archers named two of the above factors, but a vast majority named "Improvement in technique" first, with "Better instruction" second.

CHAPTER VI

COMPETITIVE ROUNDS AND PROCEDURE

(A) Camp and School Rounds

In competitive camp or school events the distances to be shot depend both on the experience of the archers and the quality of the tackle they have to shoot. Length of the class period influences the number of arrows that can be shot in a class competition.

We have found that for girls from eleven to thirteen just beginning archery a round of 60 arrows, 30 at 30 yards and 30 at 20 yards, takes up about a forty-five-minute period. For girl beginners from fourteen to eighteen 30 arrows at 40 yards and 30 at 30 yards comprise a satisfactory round. These may be designated as the official camp or school rounds and named the "Gypsy Camp Junior Round," etc. You will find that the average nine-year-old will make a score on her round comparable with that of the fourteen-year-old on hers.

(B) Junior Archer Rounds (National)

Advanced archers may be able to shoot the rounds required by the Junior Archer Association:

JUNIOR AMERICAN ROUND

for boys and girls up to and including 16 years

30 arrows at 50 yards
30 arrows at 40 yards
30 arrows at 30 yards

SENIOR AMERICAN ROUND

for boys and girls 17 and 18 years (Intermediate)

30 arrows at 60 yards
30 arrows at 50 yards
30 arrows at 40 yards

Resulting 200 scores merit the rank of ARCHER and a bronze medal.
Resulting 300 scores merit the rank of YEOMAN and a silver medal.
Resulting 400 scores merit the rank of EXPERT and a gold medal.
Resulting 500 scores merit the rank of MASTER and a special gold medal.

The standard women's rounds are the COLUMBIA:

24 arrows at 50 yards
24 arrows at 40 yards
24 arrows at 30 yards

and the NATIONAL:

48 arrows at 60 yards
24 arrows at 50 yards

Archers do not shoot the Columbia and National rounds to qualify for the above-mentioned medals, but shoot them usually in state and national tournaments. The standard round for men is the Senior American given above.

It may be that your school or camp bows are too light or have insufficient cast to allow your archers to shoot at these distances. The arrows may be too heavy or in too poor condition generally. If, however, the tackle will allow points of aim on or not too far above the target at the greater distances, or if some of your archers have good personal tackle, they should during a season or semester win at least the bronze medal. The prices of the medals range from about 40 cents to 90 cents each. Write Mr. George Cooper, Y.M.C.A., South Bend, Indiana, for further information regarding this national junior organization.

You may prefer to devise your own ranking and award system, basing ranks on scores made on the camp or school rounds instead of the Junior and Senior American Rounds. This method may be preferable for your beginners, but you should make it possible for your archers who are able to win their national medals.

(C) General Tournament Procedure

Write to Mr. Louis C. Smith, Secretary of the National Archery Association, 77 Franklin Street, Boston, Massachusetts, for a copy of the constitution of this organization and follow the rules and regulations laid down therein during all competitive shooting. Formality and strict adherence to precedent impress young archers and dignify the sport.

See that distances, even for class shooting, are always clearly and exactly marked, and that targets are mounted with exactly four feet from the center of the gold to the ground directly beneath. (National Archery Association requirement.) Allow no archer preliminary practice on the target he has drawn for a tournament. Have no more than four archers on each target, allowing each to shoot three arrows, then step back and wait, and shoot her other three in turn—if time is plentiful—otherwise let two of the four shoot together, then give way for the other two, shooting three arrows at a time as before.

Insist that each archer have six arrows to shoot each end. Have all archers begin shooting and retrieve their arrows at once to the whistle of the Lady Paramount or Field Captain. Appoint a Scorer (Captain), a Drawer, an Observer, and an Arrow Hound on each target. As the Drawer pulls the arrows (Scorer's arrows first, taking the ones nearest the center first), he calls their values and the Scorer repeats and records them individually. He draws his own arrows next, then those of the Observer and the Arrow Hound in turn. The Observer's duty is to see that no careless errors are made in scoring. The Arrow Hound retrieves misses. Scores are totaled after archers are back at the shooting line. When all are back the Field Captain blows the whistle to resume shooting.

(D) Scoring Regulations

During any tournament be sure to conform to the following rules:

1. Record each hit made: 9 for gold, 7 for red, 5 for blue, 3 for black, and 1 for white.
2. An arrow that rebounds from the target or passes through it counts as though it had hit the blue no matter where it hit the target.
3. An arrow cutting the line between two colors gets the higher count.
4. Each arrow loosed counts as a shot unless it falls near enough to the archer that he can touch it with his bow tip without moving from his shooting position.
5. An arrow shot when bow or string breaks may be shot over.
6. In case of a tie score, championship depends on number of hits made.
7. In case of dispute as to the value of a hit, call Field Captain or Lady Paramount.

CHAPTER VII

STIMULATING INTEREST IN PRACTICE AND ADVANCEMENT

(A) Awarding Ranks and Medals

A tangible reward for improved scores provides the best possible incentive for practice and therefore for improvement. Shooting for nationally recognized junior archer ranks and medals as suggested in Chapter VI is one of the best possible reward systems for junior and intermediate archers. If, however, your archers are too inexperienced or your tackle not good enough for the more difficult Junior Archer Rounds, use a ranking system based on the camp rounds. The age and sex of the archers you are devising the system for will influence the names you select for the ranks. Colored feathers to be worn in the camp headgear to denote the different ranks of archers make inexpensive awards. Or any reputable jewelry manufacturing house will execute at a small cost copies of the medal you may design for your own particular camp or school archery award.

(B) Division of the Group for Competitive Purposes

Many camps divide their campers into two or three sections or teams (not the divisions based on age, however) for competitive purposes, each camper working, not only for personal distinction in all land and water sports, but also for the glory of his team or division.

Take advantage of such a division system by scheduling preliminary tournaments between teams from the groups throughout the season, then running off a final event at the close of camp to select the first team for each section and the star team for the entire group.

If your camp makes no such division, announce at the opening of camp that after the first two weeks camp archers will be divided into two teams for competitive purposes. When that time comes appoint your two best archers as captains and allow them to choose up sides. Name the teams and schedule a match at once. Use your discretion about running off preliminary tournaments within the two groups to determine first and second teams for competitions with the first and second teams of the other group or groups.

In school or college archery your competitions will best be between first and second teams of different classes if there are enough classes to make competition interesting. If not, divide each class into two sections or teams and let these teams compete. Try somehow to inject this element of competition into your classes as it stimulates participation.

(C) The Chart Device

Some teachers have found the use of a chart stimulative to practice and to improvement. In planning a chart make whatever divisions seem advisable in view of your particular program. Keep the chart posted in a conspicuous place and KEEP IT UP TO DATE.

It seems advisable to have both a *technique* and a *scores* division of the chart. Under "technique" may come bracing and unbracing a bow, standing position, nocking, drawing, loosing, point of aim, etc. You may wish merely to check each item as an archer demonstrates to you that she has attained some skill in adjusting points of aim for different distances, in loosing with passable form, etc. Or you may prefer that each item under technique have a definite numerical value. Whether you use the former or the latter method will depend, doubtless, on the prevailing policy of your school or camp regarding point systems.

Whether you have several tournaments for establishing team ratings or one at the end of the semester or season depends on the time element. It is best to shoot for school or

camp team places at the end, whether or not your color team ratings are made then.

Obviously you cannot use this chart device to good advantage unless you have some group division as suggested under B in this chapter.

(D) Ladder Tournaments

Post a ladder (attractive ones may be had for 10 cents each) for each camp color or team division or school class, with the suggestion that all who wish places on the ladder must turn in a score which has been shot in the presence of another archer before a set date. From that time on each archer must climb the ladder one step at a time, by challenging the person immediately above her.

Division or class teams can be selected from the highest places on the ladder for final inter-class or inter-color competition.

(E) Posting Weekly Scores

Whether you teach in school or camp, designate certain days or class periods each week as *practice* periods or days and others as *score* periods. On score days shoot according to regulation procedure with a drawer, a scorer, and observer, etc., so that scores will be accurate. Have more than one of these periods each week so that should an archer fail to make one he can shoot in the others. It is advisable to let any archer shoot during as many of these score periods as he likes, taking his best score for posting.

Post the scores immediately after the scoring period is ended. If you have a chart, scores may show up there for credit in points.

Unless you are careful three or four archers will shoot high each week, dulling the competitive aspect and defeating your purpose. So give some of your most promising runners-up careful supervision so that they can give the better ones keener competition.

(F) Outside Competition

Scheduling a match with some outside team arouses keen interest. It is often possible to get such a match with another school or college—if the opposing team is too far away for a visit, shoot a team round on the home range and exchange scores by mail.

In many states a state athletic board sponsors an inter-college archery league. Find out whether there is such a league in your state.

(G) Issuing Arrows for Individual Use as a Reward

One midwestern college issues a set of eight-footed arrows for personal use to each archer who makes three consecutive 200 scores on the ladies' Columbia round. This is an effective stimulus for practice and improvement.

Should you try this device, unless your archers are unusually careless with tackle, don't check these arrows out to them with the warning that they must pay at the end of the semester for the arrows they have broken or damaged. Such a warning may dampen the ardor of your archers for winning the use of the arrows. Tell them instead that if they are careless and the resulting mortality rate on arrows is too high the practice will be discontinued.

(H) Establishing an Archery Library

It is well, particularly in a camp group, to accumulate an archery fiction and adventure library. The following are some popular additions to such a library:

"Sir Nagel" and "The White Company," by Sir Conan Doyle; "The Merrie Adventures of Robin Hood," by Howard Pyle; "Under Drake's Flag," by Henty; "The Green Archer," by Wallace; "Tekla," by Robert Barr; "Black Arrow," by R. L. Stevenson; "Red Eve" and "World's Desire," by Rider Haggard; "Shoulder Arms," by J. P. True; "The Witchery of Archery," by M. Thompson; "Archery Sim-

plified," by P. Rounsevelle, deals primarily with the technique of shooting and teaching to shoot.

* * * * * *

Use as many of these eight stimulative devices as you like; you will find that the first four tie up well together. Try to have your season's program and policy well planned before the camp season or school semester begins. Don't wait until the last of the season to post your chart or to start competitions.

Teach your archers to shoot with acceptable form in the first place and these devices will make it interesting for them.

Date Due

DUE	RETURNED	DUE	RETURNED
JAN 27 '53	APR 15 '53		
MAR 2 [illegible]	JAN 2 [illegible]		
FEB 24 1955	FEB 15 1955		
MAR 30 '55	APR 5 '55		
DEC 19 1958	JAN 26 1959		
OCT 29 '61	OCT 29 '61		
[illegible]	AUG 5 '65		

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KEEP CARD IN POCKET

Date Due

DUE	RETURNED	DUE	RETURNED